NOLOGY DEPT.

Gas Journal

VOL. 290. 109th YEAR. LONDON, MAY 29, 1957. No. 4898. PRICE 1/6

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DETROIT

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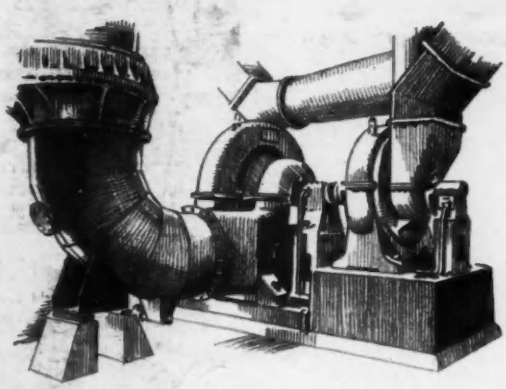

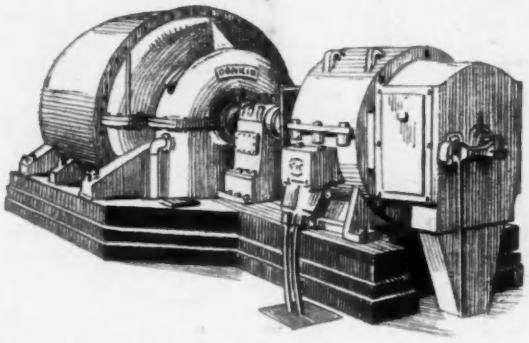

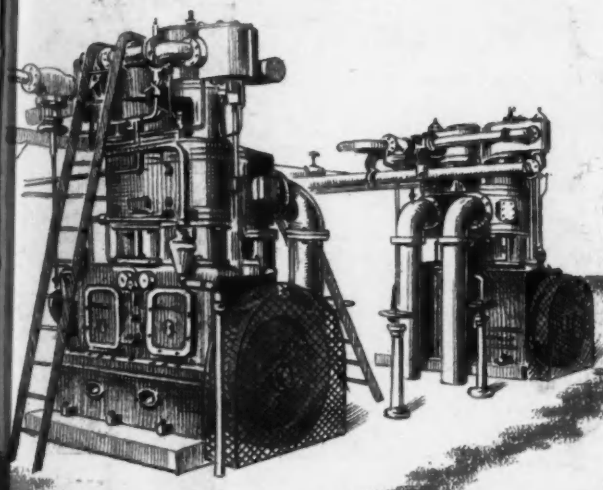

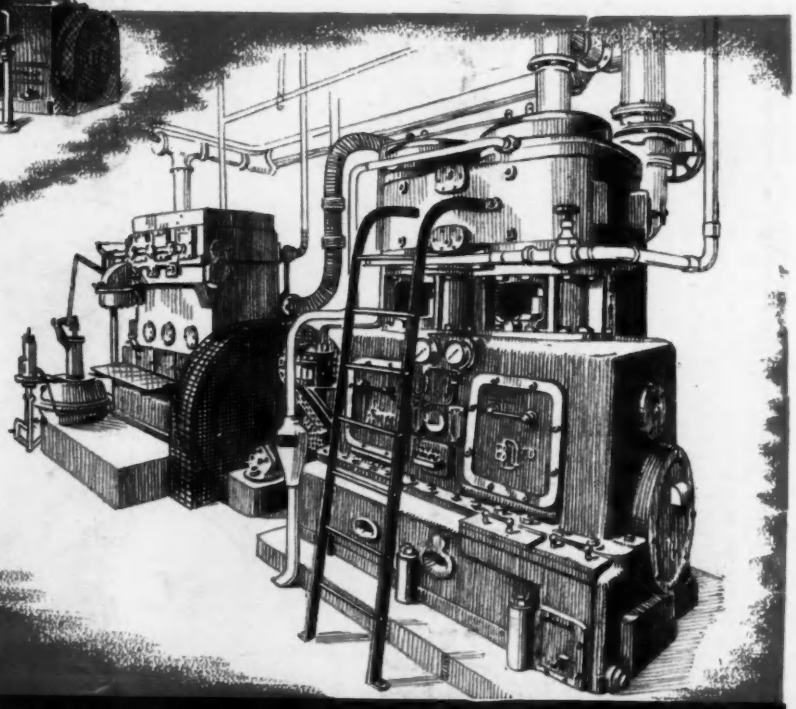

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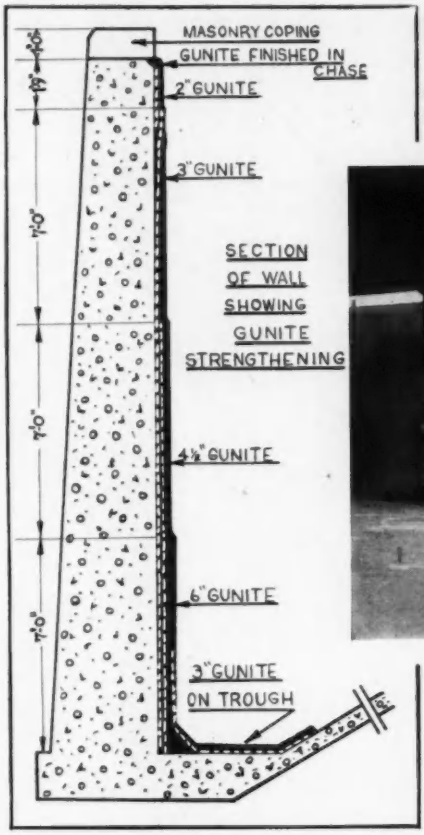

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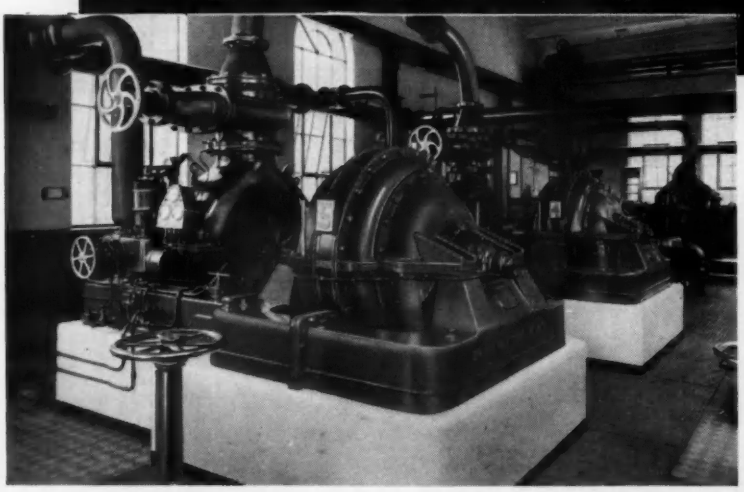

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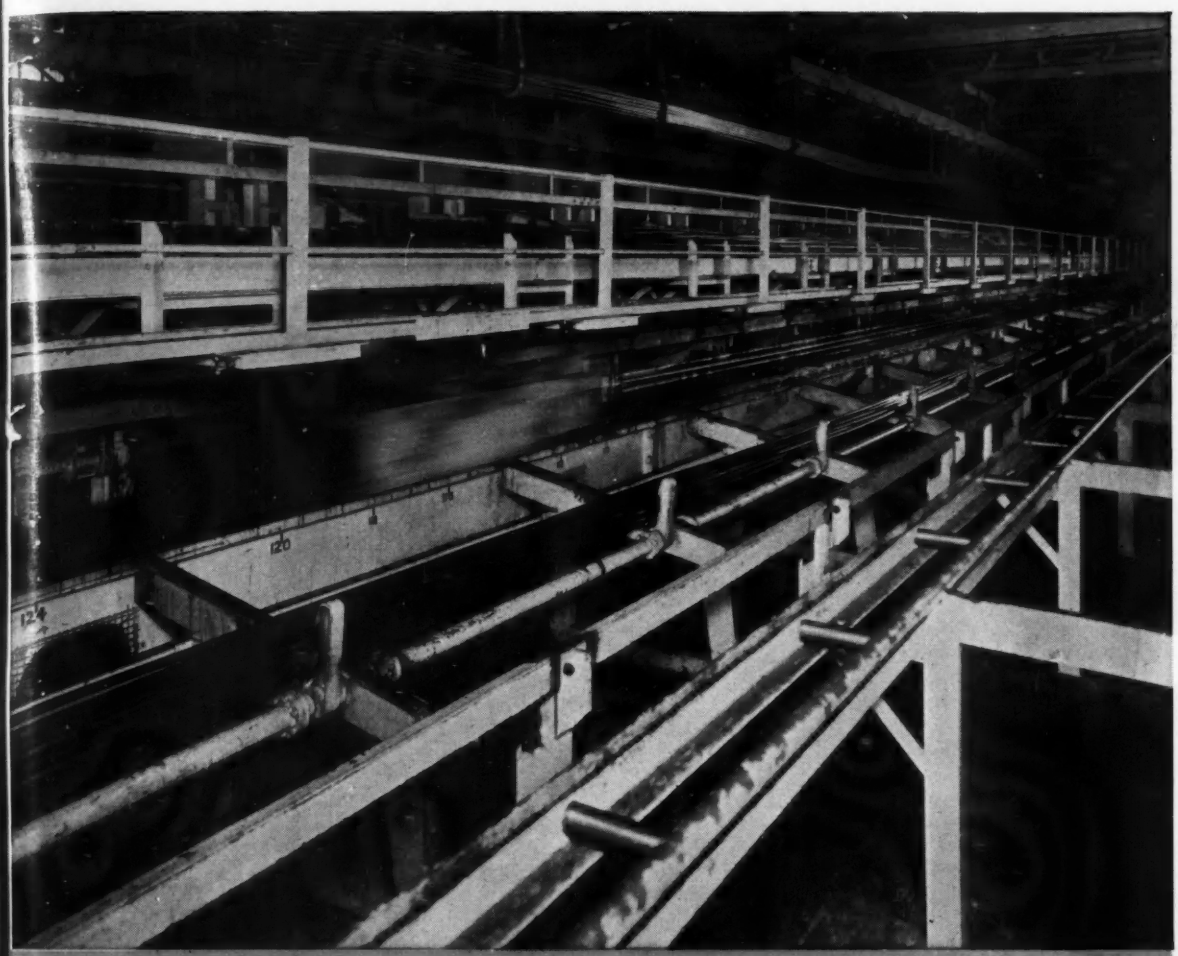

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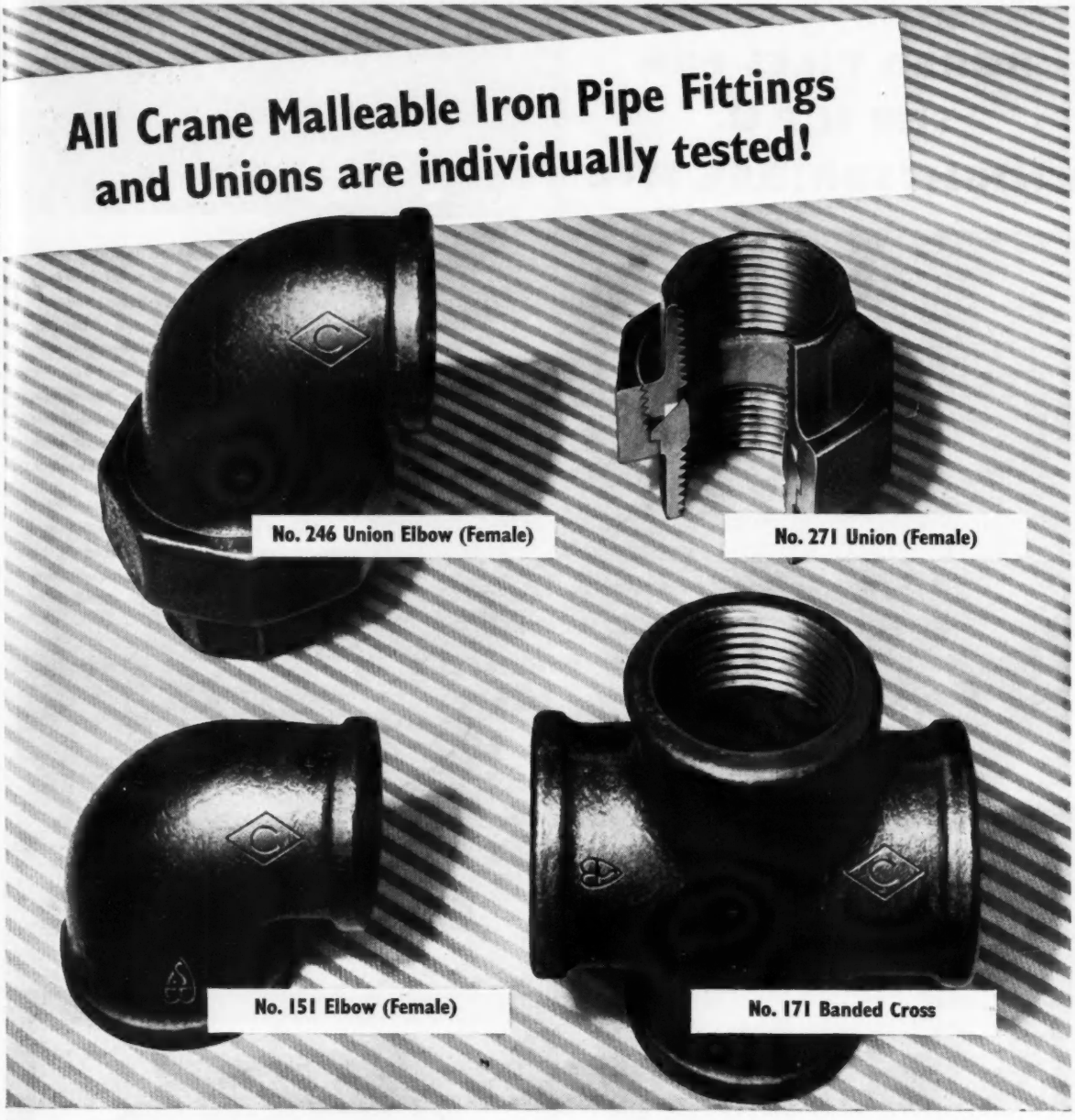

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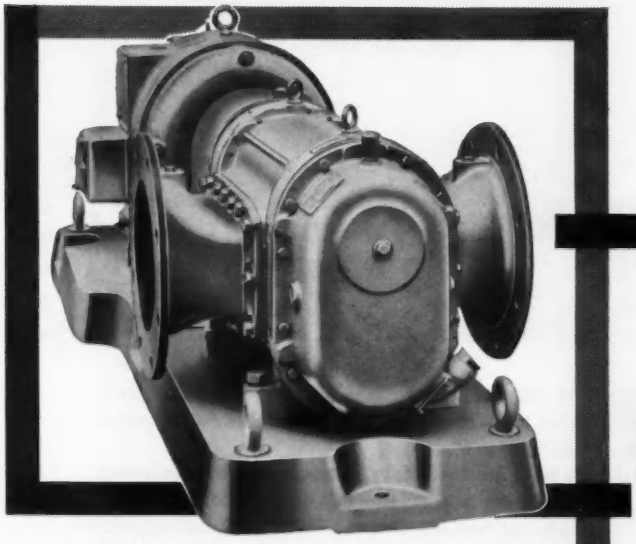

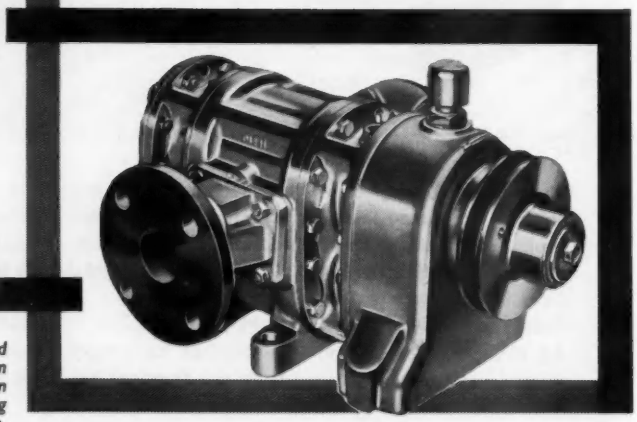

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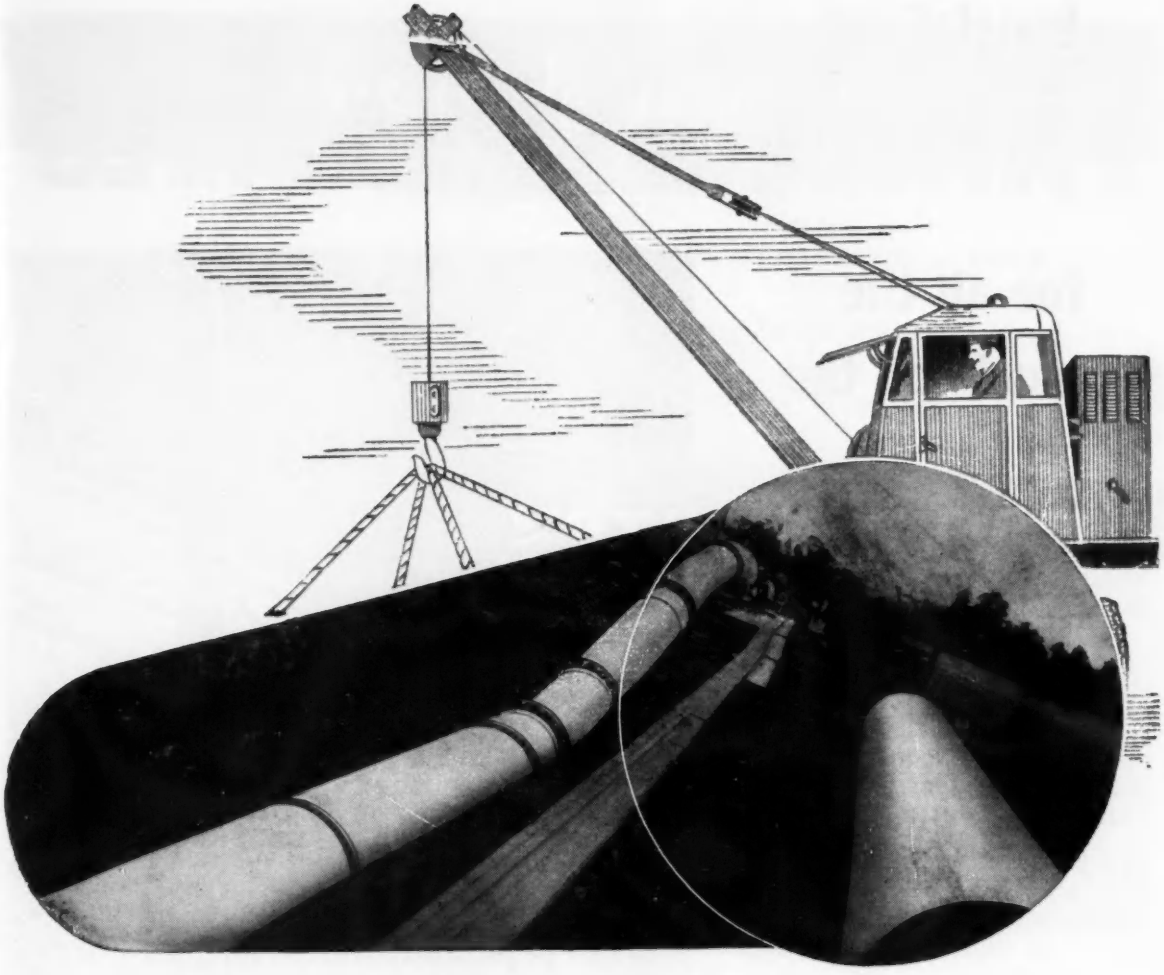

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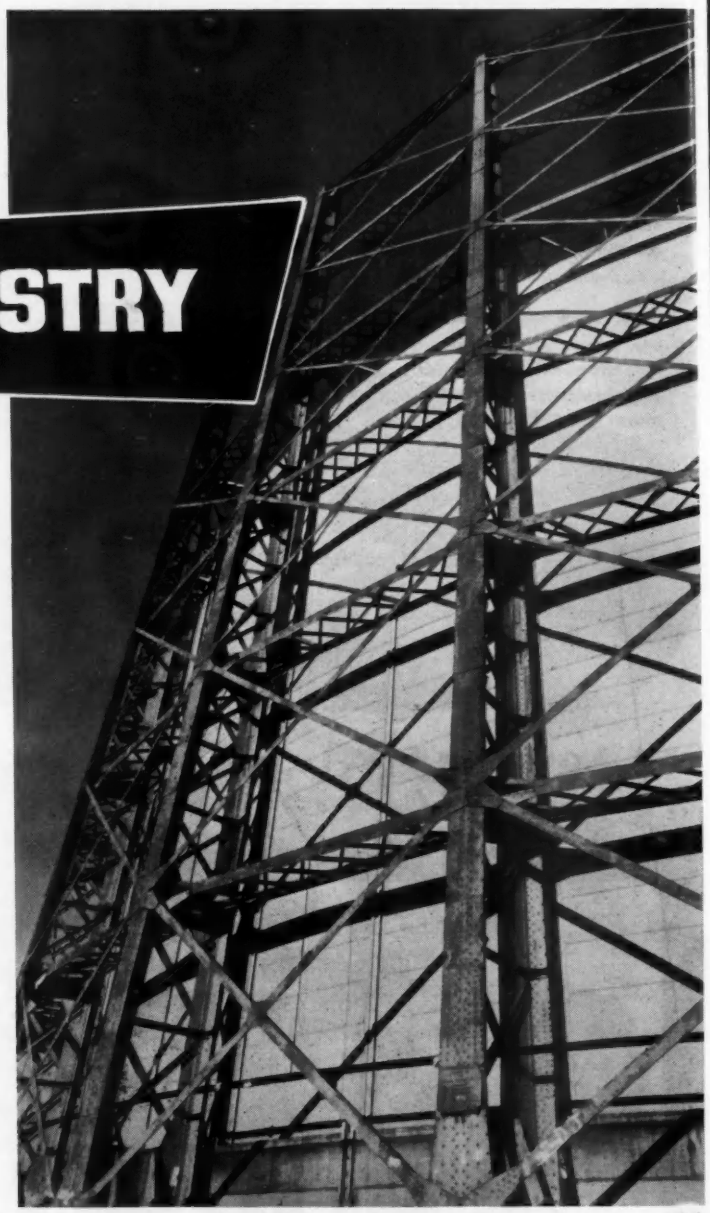

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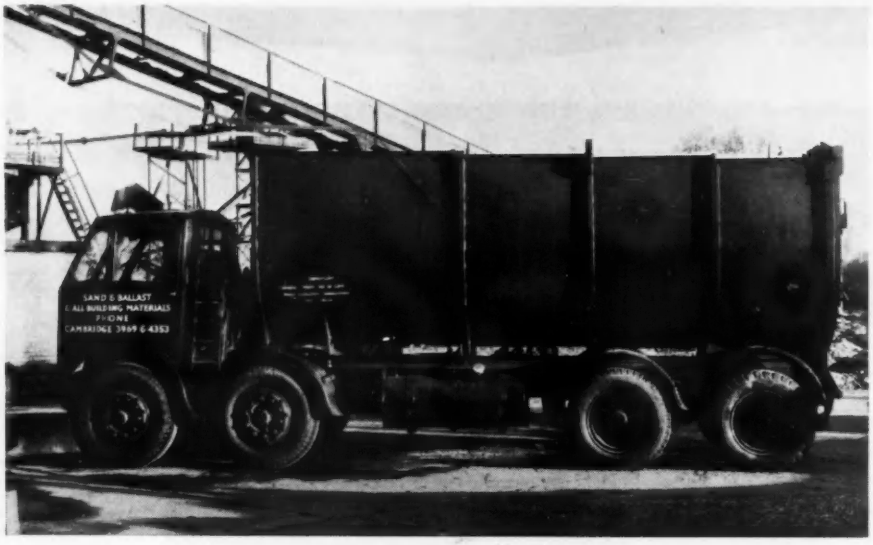

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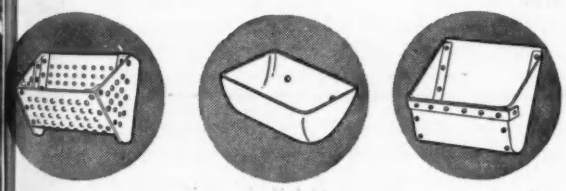

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Gas Journal

VOL. 290 NO. 4898 May 29, 1957

109TH YEAR

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Gas Journal

VOLUME 290. No. 4898. MAY 29, 1957. 109th YEAR

The Scottish Board's First Staff Conference

ON the first day of this month the gas industry reached the eighth anniversary of vesting date; and Mr. Sydney Smith, the first anniversary of taking up his appointment as Chairman of the Scottish Gas Board. We were reminded of this when Mr. Smith opened the Board's first staff conference, held at Perth last Thursday and Friday. The fact is interesting because, as we see it, during the past year Mr. Smith has been doing the things which might well have been done in that first year of nationalisation. Indeed, he has done more because he is trying hard to make up for lost time—for the years which have brought a drop in average consumption per domestic consumer from 122 therms in 1950-51 to 104 therms in 1955-56 and the comparatively placid acceptance by the Board of the increasing momentum of electrical competition. The indications are that Mr. Smith, who was firmly entrenched as Chairman of the East Midlands Gas Board, regarded the move North of the Border as something of a 'mission,' and the Scottish Gas Board as a patient requiring urgent medical attention. As a medical missionary Mr. Smith—we might almost say Dr. Smith—had little time for the gentle practice of psychiatry. The psychoanalyst's couch was pushed aside in favour of the operating table, and the notebook and pencil gave way to the scalpel. Clearly he felt this was a time for serious measures and he took them without hesitation. It is of course too early to assess the success of the operation—indeed the patient has by no means lost his bandages. But to judge by this conference there are signs that the post-operative effects are wearing off and the patient is about to take on a new lease of life.

The conference itself was interesting for several reasons. It cannot be said that it was universally welcomed since inevitably there must be a certain amount of suspicion at innovations of this kind. And not only suspicion but resentment in that the conference had supplanted the Spring Meeting of the Scottish Association of Gas Managers. As Sir Harold Smith put it: 'When I was not asked to bring my golf clubs I knew an enormous change had taken place!' However, it is surely true that the dissentient and reactionary elements who contemplated the prospect of a staff conference with a measure of scepticism were at least partially converted. Inevitably we were tempted to make a comparison with the first East Midlands staff conference at Skegness and, surprisingly enough, we thought the Perth meeting to be more cohesive and responsive. It may be that one reason for this was the extraordinarily well planned programme in which papers and addresses dovetailed neatly together to give a clear overall pattern of the Board's present position, its aspirations, and the means by which it hopes to achieve them.

There have, of course, been some substantial changes in the area. The Board recently introduced a new structure of administration designed to operate in bigger units and based largely on a functional form of control. Four divisions now do the work of ten and Mr. Smith was at pains to explain the way in which the number of links in the chain of command will be reduced. Naturally there was much talk of functionalism and it was difficult not to think back to the classic C. H. Leach paper on the subject given before nationalisation and to contemplate the way in which his then rather outlandish ideas have been gradually accepted elsewhere in the industry. At the same time we could not help wishing that some other word might be coined, something possessing more humanity and less identifiable as big business commercial jargon. Nevertheless, whatever one's feelings about or against functionalism, there could be no denying that the Chairman's address ranged comprehensively over every aspect of the Board's activities. From this general survey and appraisal the agenda embraced talks on capital expenditure and its incidence, on the application of work study both from the viewpoint of the management and the trade unions, on stores control, and on future developments in Scotland's coal industry. But the two key papers described the Board's future plans both in the field of manufacture and of sales. The former was outlined by the Board's Chief Engineer, Mr. T. S. Ricketts. Under the title 'Integration Study' he painted a picture of Scotland served by a streamlined, large scale, high pressure gas grid system superimposed, if necessary, on the proposed West of Scotland Grid, which will serve Glasgow, Renfrewshire and substantial areas of Lanarkshire and Ayrshire, and the East of Scotland Grid, which will serve the counties of Fife, Perth, Angus, Kinross, and part of Kincardineshire. The proposed system of grid mains to be constructed will enable gas production to

cease at a further 69 works by 1962—we say further because 52 works have already been closed since vesting date—and 14 more works can cease production by 1967. Of the 61 works which are to remain in operation 36 are too remote or too financially unattractive for a grid supply to be considered; the remaining 25 works will be of sufficient size and importance to achieve the highest efficiency of production and to ensure the maximum economy in operation; 19 of these works will be in the industrial belt. The type of grid which may be developed in the future would include a complete gasification plant in Fife producing gas but no coke, a large gasworks in Glasgow producing gas and coke from coking coal and also receiving supplies of coke oven gas, and the orthodox gasworks at Edinburgh producing gas and reactive coke from low-rank coals. Additional sources of supply may be provided by the oil gasification plant located near Grangemouth oil refinery and by reforming plants located on the Clyde to treat imported liquid methane. If the natural gas well at Cousland can be used for underground storage the grid will be extended to Cousland.

Clearly then the production and integration programme is original, and ambitious. Unfortunately the commercial programme is positively humdrum by comparison. Mr. R. H. Bone, the Board's Commercial Manager, presented an interesting paper but one which was only imaginative when seen in relation to Scotland; in most other areas it would be regarded as very ordinary indeed. As we have mentioned, the yearly loss in consumption over the past six years has averaged 18 therms per consumer; appliance sales have dropped alarmingly. Mr. Bone set out to discover why this should be so and in what ways the attitude of the Scottish household towards gas differs from elsewhere. He suggested four main factors: The affection with which the open coal fire is regarded and its use for water heating and sometimes cooking; the Scottish housewife's tendency to think first of electricity when contemplating a departure from the traditional fire, the result of publicity and the patriotic appeal of the Hydro-Electric Board; the smaller amount of money available; and, very significantly, the comparatively low level of service expected of the Gas Board. For this last reason the emphasis will in future be on service, so much so that the Chairman insisted on using the phrase 'service and sales' instead of the other way round.

There is much to be done on the sales front and it must be done quickly. There is a crying need for good publicity and we thought it a pity that greater emphasis was not laid on this at the conference where examples of posters and new literature would have given an indication of things to come. Indeed, the staging of the conference was unimaginative compared, say, with some of the efforts achieved in Mr. Smith's old stamping ground in the East Midlands. However, full marks to somebody for an eight-page gas supplement in the Scottish newspaper, the *Bulletin*, the publication of which tied up with the conference.

Audience reaction throughout the conference was good. We remember in particular Mr. W. Nicol Baird who, buoyed up by Mr. Ricketts' ambitious plan for the future, put forward suggestions for extending the grid network still further, and Miss Sheila Macdonald, who put in a much needed word for home service advisers and, we hope, brought a general realisation of the fact that for an organisation planning to sell more domestic appliances, the Board seemed to be giving remarkably little thought to feminine influence.

Water Pollution

THE Report of the Water Pollution Research Board for 1956 is concerned with problems of work which have not much direct bearing on our own problem of the treatment of gasworks and coke oven effluents either before or after their evacuation to the sewers. A large section of the report is taken up with the continuation of the survey of the waters of the Thames Estuary. 'The main effort has been directed to the mathematical problem of predicting the distribution of dissolved oxygen in the estuary from a knowledge of the amount of polluting matter discharged, the rate at which it is oxydised, the rate of re-aeration, and the effect of tidal fresh-water flow on mixing of the discharges with estuarine water.' A very fair measure of success appears to have been achieved in the solution of this formidable problem. The advantage of such a solution is that it makes it possible to calculate, at least approximately, what would happen if new discharges to the estuary were allowed or if the strength or volume of existing ones were changed. The basis appears to be the concentrations of dissolved oxygen at different positions along the estuary and these appear to reach the minimum, i.e., 0% saturation, between roughly 10 to 20 miles below London Bridge, swinging back and forth with the tide.

Very little is reported on the effect on the pollution of the estuary of the very considerable volume of effluent which must be discharged to it from the several large gasworks sited along its bank. One test of any pollution is its effect on the life of fish, and here it is interesting to note in the report that of the fish mentioned, the rainbow trout is the most sensitive to low concentration of oxygen and, as might have been expected, tench is the most resistant—'at 10°C. they survived for a week under conditions which, in a river, would be considered almost anaerobic.'

But apart from the effect of low oxygen content there is the direct toxic effect of such constituents of effluents —for instance, 'the lethal effect of oxygen deficiency may be reinforced by ammonia supplied by the effluent.' Referring specifically to gasworks effluent, 'results show that in the relative concentrations in which they were present in spent liquor, the phenol was appreciatively less toxic than the ammonia.' Experiments and tests with different mixtures are reported, showing, among other things, 'that the greater part of the toxicity of the spent liquor examined was due to ammonia and monohydric phenols, of which that due to ammonia was the more important.' These experiments have shown that the effect appears to be additive, so that it should be possible to calculate the toxicity of a gas liquor from the concentration of ammonia and phenols determined by chemical analysis.

Quite a lot of space is devoted to the troublesome effect of synthetic detergents (with 'foaming') but perhaps the most interesting feature of the report is the continued work on the perfection of apparatus for recording automatically the concentration of dissolved oxygen in water.

Personal Notes

MR. DAVID L. DICKSON, who has been Fife Group Manager of the Scottish Gas Board at Dunfermline since 1949, has been appointed Assistant Divisional General Manager of the new Central Division, created under the reorganisation scheme introduced by the Scottish Gas Board recently, covering the area previously supervised by administrative centres in Dundee, Perth, and Fife. Mr. Dickson will take up his new duties in July. MR. W. S. JOHNSTON, Group Manager at Dundee, has been appointed Station Manager of Dawsholm Gasworks, Glasgow. He expects to take up his new post in two or three months.

MR. A. M. HOLBEIN continues as President of the Federation of Civil Engineering Contractors for 1957-58. He became President in 1956. The new Chairman of Council is COLONEL A. C. NEWMAN, V.C., who takes over from LT.-COLONEL T. MCMILLAN. MR. E. C. BECK is the new Vice-Chairman.

MR. JOHN STALLARD, who will be 100 on Friday, is a member of a family which was intimately connected with the Worcester New Gas Light Company from the time of its formation in 1846. He was Solicitor to the Company prior to 1933, when he was appointed Chairman, a post he held until nationalisation. Since then Mr. Stallard has continued to practice as a solicitor with his firm, John Stallard & Son, and although visits to his office have been less frequent of late, he can claim to be the oldest practising solicitor in Britain, if not the world.

MR. S. MEUNIER, at present Radiation Group Sales Ltd., North Western Area Manager, has been appointed Northern Sales Manager covering Scottish, Northern, North Eastern, North Western, West Midlands, Wales and Ireland. He will continue for the time being to operate from the Manchester office. MR. J. S. WOOD ceases to be Southern Regional Controller and becomes Southern Sales Manager covering East Midlands, Eastern, North Thames, South Eastern, Southern and South Western. He will continue to operate from head office in London. MR. H. W. P. SHEWRING, at present a Representative in the North Western Area, is appointed North Western Area Manager and Mr. P. G. COLE, Showroom Manager, Rochdale, joins the Organisation and fills the vacancy of a Representative.

MR. R. C. ARNOLD, Manager of the Splading-Stamford group of the East Midlands Gas Board at Spalding, Lincs., since 1955, has obtained a new post in Australia with the Colonial Gas Association, Ltd. He leaves this country in July for Australia with his wife and two sons and will make his new home in Melbourne. Previously technical assistant at Loughborough (Leics.) gasworks, Mr. Arnold went to Spalding in 1947 as Deputy Gas Engineer of the Urban District Council undertaking. In 1948 he was appointed Gas Engineer, and he became Group Manager on nationalisation.

MR. G. E. CLIFFORD has been appointed Technical Director of Air Control Installations Ltd. Mr. Clifford has been Chief Engineer of the Company since 1936 and joined the Board as alternate Director in October, 1955. He has recently visited the U.S.A., where he attended the Atomic Energy Conference and took part in technical discussions with Air Control's associates, the American Aid Filter Co. of Lousville, Kentucky. MR. H. C. S. BRAND has been appointed Works Director.

MR. J. E. CLARK, who joined the staff of British Oxygen Wimpey Ltd., when it was formed last December, has been appointed Deputy Manager of the Midlands District of British Oxygen Gases Ltd., with headquarters in Birmingham.

MR. ALFRED HATFIELD has retired from his post as shift supervisor at the Leeds Road branch of the North Eastern Gas Board, thus ending a link between the gas industry and his family which has lasted over a century.

CORRESPONDENCE

Dr. Niels E. Rambush, A Personal Tribute

DEAR SIR,

Being (as I believe) his oldest friend, I feel constrained to write the following few lines as a personal tribute to the memory of Dr. Niels E. Rambush, and to our 46 years' valued friendship, which commenced when, on my invitation, he came to England in 1911 at the age of 22 to be my technical assistant, and later, as a result of his great ability and unstinted co-operation, my partner. We were for many, many years colleagues and at all times, from the earliest days, he was my very close friend.

Though he was born a Dane, he became long ago a very patriotic Englishman.

His activities in chemical and gas engineering are well-known, and his devotion to, and eminence in these branches of technical life and the positions he filled so brilliantly are referred to elsewhere.

He was a man of outstanding intelligence, courage, energy, and vision, respected and beloved by all who worked with or for him, and always helpful when called upon. He had no enemies, and died as he had lived a very brave man.

As a tribute to his memory, I may indeed appropriately conclude this brief expression of affectionate homage by Shakespeare's lines—

'His life was gentle; and the elements so mixed in him
That Nature might stand up and say to all the world
"This was a man".'

Yours faithfully,
ARTHUR H. LYMN.

London.

May 22, 1957.

Obituary

MR. OLIVER JAMES BARLEY, of Highfield, Oxford Road, Thame, Oxford, has died, aged 79. He was a former Chairman of the Thame Gas Company. He took a full part in the administrative life of the district, having been chairman of the Thame Urban District Council, and for 17 years a member of the Oxfordshire County Council, for the last two of which he was a county alderman.

MR. ROBERT MCALPINE, who was overseer in the Newtownards Borough Council's Gas Department, has died after 45 years' service with the Department.

Diary

May 30.—WALES AND MON. JUNIORS: Visit to the Stanlow Refinery. 10.30 a.m.

May 31. — LONDON AND SOUTHERN JUNIORS: Meyerstein Theatre, Westminster Hospital School of Medicine, Horseferry Road, London, S.W.1. Annual Business Meeting. 6.30 p.m.

June 1.—EAST OF SCOTLAND JUNIORS: Golf Outing. Perth.

June 3/4.—EASTERN SECTION, I.G.E.: Skegness. A.G.M. 'Application of Electricity in the Gas Industry,' by R. Hutchinson.

June 4.—INSTITUTION OF CIVIL ENGINEERS: A.G.M.

June 4.—INCORPORATED PLANT ENGINEERS, MANCHESTER BRANCH: The Engineer's Club, Albert Square, Manchester. 'Air Compressor Maintenance and Installation and Ancillary Equipment,' W. McMillan. 7.15 p.m.

June 4.—INCORPORATED PLANT ENGINEERS, LONDON BRANCH: Royal Society of Arts, John Adam Street, Adelphi, Strand, W.C.2. 'The Training of Plant Engineers,' J. Wilson. 7 p.m.

June 4.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, London, S.W.1. 11 a.m.

June 5.—SOUTHERN G.C.C.: The Administration Building of the Esso Refinery, Fawley, Southampton. 11 a.m.

June 12. — COMBUSTION ENGINEERING ASSOCIATION: St. Ermin's Hotel, Westminster, London, S.W.1. 'Coal: Some Forecasts,' by R. J. Moffat. 10.30 a.m.

BENZOLE PRODUCERS' CONFERENCE

Held in Britain for First Time Since the War

DELEGATES from France, Holland, Belgium, Germany, and Britain attended the International Conference of Benzole Producers held in London under the Presidency of Mr. L. W. Blundell, Controller of By-Products North Thames Gas Board, from May 8 to 10. This was the first time since 1936 that this Conference had been held in Britain, and the first time since 1936 that Britain had held the Presidency. Hosts for the Conference were the National Benzole and Allied Products Association, of which the Secretary is Mr. W. E. Cartwright, of Benzole Producers, Ltd.

The Conference brought together technical and commercial representatives of all three sections of the benzole producing industry—the coking, iron and steel, and gas industries. Subjects discussed ranged from international specifications to marketing arrangements (import and export); from exchange of statistics to general trade matters.

The Conference began with a party at the May Fair Hotel for the reception of delegates. On May 9 there was a technical session, an economic session, a plenary meeting, and an official dinner for delegates and members and their ladies. On the last day the Beckton works of the N.T.G.B. was visited and afterwards the chemical products works. There was also a coach trip for the ladies to the Thames Valley.

'I Am Proud'

During the dinner on May 9 the President, Mr. L. W. Blundell, speaking on behalf of the Executive Committee of the National Benzole Association, welcomed the Continental delegates and their wives to the Conference. 'In one respect,' said Mr. Blundell, 'I am particularly proud of being your President. For almost a quarter of a century ago this position was filled by the Governor of the Gas Light and Coke Company —Sir David Milne-Watson—when I was a chemist at the Beckton by-products works of his Company.

'There has never been a time when international meetings were of greater significance than at present, and we in Great Britain feel that these conferences are of the very greatest value in promoting international understanding. We have always been extremely proud of the warm friendship that exists among the European benzole producers—a friendship that has endured for nearly 30 years, bringing us together on these very pleasant occasions.'

Mr. Blundell went on to welcome the British guests, including Sir John Stephenson (Chairman, Eastern Gas Board), Mr. R. N. Bruce (Deputy Chairman, North Thames Gas Board), Mr. J. Latham (Deputy Chairman, National Coal Board) and Colonel P. F. Benton Jones (United Steel Co., Ltd.)

Seen during the visit to Beckton are, left to right, Mr. W. E. Cartwright, Secretary, National Benzole Association; Mr. Jean Bing, Conference Secretary; Mr. F. A. Jackman and Dr. Thom, Imperial Chemical Industries; Mr. L. W. Blundell, Conference President and Controller of By-Products, North Thames Gas Board; and M. Cuckney, Chemist-in-Charge, Ammonia plant, chemical products works.

Radiant Heating Sales Director Designs his own Exhibition Stands

AS the primary business of Radiant-Heating Ltd. is overhead heating, Mr. C. A. Lewis, Sales Director, long ago realised that he must take steps to counteract the fact that stand designers and fitters for exhibitions do not have any flair for visual display of overhead units.

Mr. C. A. Lewis.

Five years ago at the Factory Equipment Exhibition at Earls Court, Mr. Lewis found that the standard display fittings in the shell stand area were unacceptable for graphic visual display of overhead heating units. The authorities agreed that he should design his own display in the shell stand area and since that time he has designed the exhibition stands of Radiant-Heating Ltd. at this exhibition and at Hotelympia.

This year's stand at the Factory Equipment Exhibition was fitted with overhead heating units, switched on and off by time switches, to illustrate the fast heating of the Company's products.

Mr. Lewis, who joined Radiant-Heating Ltd. 29 years ago, claims that his first position in the drawing office gave him a proper background for stand designing. He joined the Board in 1951 and was appointed Sales Director in 1955.

Holder Water Must Not Enter Ouse

An application by the Eastern Gas Board for permission to discharge gasholder water from Bedford gasworks into the River Ouse has been rejected by the Great Ouse River Board. An analysis of the gasholder water has shown that it is not fit for discharge into the Ouse and it is now proposed to get rid of it through the Bedford Corporation sewers.

TV VIEWERS SAW HARRIS COMPANY STAND AT B.I.F.

A NEW venture for the Harris Engineering Co., Ltd., was to participate in a television broadcast from the British Industries Fair at Castle Bromwich. The programme consisted of a half-hour magazine entitled 'Come to the Fair' and featured a number of prominent exhibitors.

The Harris Company was the only firm connected with the gas industry to participate and their contribution consisted of an interview with Mr. Norman Gidney, Senior Midlands Representative, in which he described views of typical installations of the Company's gas infra-red radiant heaters and gas unit heaters.

The broadcast proved to be a source of additional enquiries and stimulated even greater interest in the Company's stand.

B.P. FIND NATURAL GAS

May Be Suitable For Industry

ENGINEERS of the British Petroleum Exploration Company who have been boring for oil at Trumfleet near Doncaster, have discovered pockets of imflammable natural gas, mostly methane, of a quality which may be suitable for industrial use.

The bore is two miles from Thorpe-in-Baln where the Central Electricity Authority plans a gigantic £40 mill. power station. A few miles away is Hatfield Main colliery at Stainforth.

So far investigations of the drilling have not revealed the extent of the gas found, but Mr. W. M. Watson, General Manager of the Exploration Company, says: 'It will be some weeks before we know just how much gas is available, but whatever the amount the gas can be put to industrial use. We shall now deepen the drilling—now at 3,350 ft.—in order to investigate further the quality of the gas and to get more control over it.

'We shall have to wait until the well is finished and the mud cleared away before any move about piping off the gas can be made. We intend taking the bore to 5,000 ft. in the hope of finding oil. So far the gas has been our only find, but we are still hoping.'

Industrial concerns in South Yorkshire will watch the developments at Trumfleet with considerable interest as a large natural gas find could mean a new cheap source of power. If the gas is suitable (and it is said to be of 'high calorific value') it will first be offered to the British Gas Council.

4 OUT OF 5 NEW CREMATORS ARE GAS-FIRED

Folkestone Conference

GAS has established itself as an efficient fuel for cremation—at four out of five newly-built crematoria gas-fired cremators are being installed.

Gas can also be used for the greater comfort of mourners and crematorium staff.

Some of the ways it achieves this will be shown on the Gas Council's stand at the exhibition held in conjunction with the 1957 Cremation Conference at the Hotel Metropole, Folkestone, June 25-27.

Latest appliances for heating the water in cloakrooms and warming the air in chapels and rest rooms will be exhibited.

Highlight of the recent two-day 'Hotelscope' Exhibition, sponsored by Scarborough Corporation, was the international cooking competition, for which the North Eastern Gas Board installed cookers and water heaters. Winner of the eliminating competition, using the new Main No. 122 'Super Century' cooker, and representative for Britain in the international event, was Mr. Albert King of Holmlea Private Hotel, Scarborough. Mr. King also won the final trophy.

Unhurt—But he'd had his Chips!

THIRTEEN years old Patrick Biddle normally has his dinner at school. But on May 15 he went home to 66, Newton Road, Sparkhill, Birmingham, because he was taking an examination at a school nearby.

Patrick decided to cook himself some chips.

He lit the gas cooker and there was a loud explosion. Patrick dived for the floor as the kitchen window and its frame were blown outwards.

Fat in the chip pan caught fire setting the kitchen window curtains alight and scorching paintwork. The boy quickly put the fire out, but his hair was singed.

Said Patrick later: 'I was a bit dazed and I didn't get my chips.'

ELECTRICITY 'BLACKMAIL' ALLEGATION

Board 'Prepared to Adopt Unfair Tactics'

AN allegation that the Electricity Board was using blackmail tactics to try to drive out gas was made at a meeting of Falkirk Town Council. 'It is all wrong that a quasi-nationalised body should be so fierce in using public money to wipe out competition,' Bailie Miller declared.

But in spite of his and other protests, the Council decided by twelve votes to eight to install electricity services only in all future housing schemes.

Bailie Miller pointed out that foundries in the area were producing gas cookers. They were now proposing to abandon those industries. More people were employed in the gas industry in the area than in the electrical industry.

He did not like the blackmail tactics of the Electricity Board to drive out the gas industry—if they took something it would cost £15 per house; if they took something else there would be a reduction; if they went all-electric the crimson carpet would be laid out for them. These tactics were unfair.

If they came to an agreement what they would do was walk up to the electric chair and clamp themselves in at the mercy of the Electricity Board. The Board, after they had got their schemes all-electric, might charge what they pleased. The Council would regret it if they put themselves at the mercy of a Board who had already shown that they were prepared to adopt unfair tactics.

Councillor J. Middlemass said he was quite satisfied that the vast majority of housewives still preferred gas cooking. If the housewives wanted gas he thought they had no right to deny them.

Councillor Silcock declared that 85% of the housewives cooked by gas.

Bailie Leishman, who had moved the all-electric motion, said that in the scheme at present going on they would save £7,500 if they decided to go all-electric.

Midland Juniors Annual Meeting

A 'MOST SUCCESSFUL' session was reported at the annual meeting of the Midland Junior Gas Association held in Birmingham recently under the chairmanship of the President, Mr. J. A. W. Stretton.

Mr. F. A. Tait and Mr. A. W. Sanders were elected to the Council, and Mr. J. A. Tomes was also elected to the Council in view of his impending position as Chairman of the National Association of Juniors. Other officers elected were: Hon. Treasurer, Mr. S. Brockbank; Hon. Auditor, Mr. R. L. Shaw; Hon. Transactions Secretary, Mr. L. H. Hardy; and Hon. Secretary, Mr. H. J. Reynolds. Education Representatives appointed were: Mr. D. J. O. Bath, Mr. J. A. Tomes and Mr. A. W. Sanders.

It was announced that Mr. S. C. Porter, Divisional Chief Chemist at the Central Laboratory, Nechells, had been invited to become Junior Vice-President and had accepted the invitation. A talk on 'The art of public speaking' was given by Mr. J. Lewis of Wellington, Salop.

GOING TO BED? —THEN TURN OFF THE GAS!

Notices to be placed in old folks' homes

NOTICES are to be placed in 100 old people's homes in the Halifax area warning them to turn off all their gas taps before going to bed. The idea for this experiment of the North Eastern Gas Board was suggested by Alderman Whittaker of Todmorden at the last Consultative Council meeting in Leeds.

It was reported at the same meeting that the N.E.G.B. had agreed to give publicity to the fact that no charge is made for investigation of complaints of poor gas pressure where such work is undertaken on the supply pipe before the meter.

A resolution tabled by the Leeds Committee was adopted after amendment; it read:—

> 'That this Committee recommends the Council to approach the appropriate Ministry and point out that it would materially assist the implementation of the Clean Air Act if local authorities were encouraged to include in their application for borrowing powers the provision of equipment which has been specially designed to burn smokeless fuels.'

It was reported that the Board had agreed to make a more generous trading-in allowance on old gas appliances when new appliances were purchased, in accordance with a Hull Local Committee recommendation.

The next meeting of the Council will be on July 15.

This is what the Gas Council's stand at the 1957 Royal Show, to be held at Norwich in July, will look like. The exhibit is in two parts, a pavilion showing domestic equipment and a barn containing coke-burning grain dryers in action. The stand was designed by M. L. Foster, of the Gas Council's Exhibitions Department.

S.E.G.B. Signs Contract for Isle of Grain Gas Main

FINAL STAGE IN £1.5 MILL. SCHEME

A CONTRACT has been placed for laying 11 miles of gas main from the South Eastern Gas Board's new gas-from-oil works adjoining the Kent oil refinery on the Isle of Grain to the Board's grid-main near Rochester. The Contractors are William Press & Co., Ltd., of Tottenham.

This is the final stage in a £1,500,000 scheme of mainlaying which will enable gas from the Isle of Grain to boost supplies to South London and even places as far away as Guildford and Horsham.

The main will be 30 in. in diameter and able to carry at high pressure up to 40 mill. cu.ft. of gas a day. Nearly 2,500 tons of steel will be required and it is being laid in open country as far as possible, to avoid breaking up roads. As an additional safeguard against corrosion, cathodic protection is being used.

In co-operation with the British Petroleum Company and the Medway Water Board, an 18-in. water main of spun iron will be laid in the same trench as the gas main. This will bring water needed for gasmaking and will supplement the supply to the expanding oil refinery.

The mains will be completed early in 1958 and the works will start production up to 20 mill. cu.ft. daily during the year.

It was in September, 1955, that the Board and B.P. first announced their agreement to go ahead with the project for making gas from oil products at the refinery on the Isle of Grain.

Continue to Express Your Views, Manchester Juniors are Told

A TWO-HOUR tour of the Lostock Hall works of the North Western Gas Board's West Lancashire Group was the highlight of the Manchester Juniors' meeting on May 11. They afterwards listened to a talk by Mr. Basil M. Evans, Civil Engineer, North Western Gas Board, entitled 'Notes from a Civil Engineer's Diary.'

Mr. A. K. Collinge, General Manager of the works, who said he was still a member of the Junior Association, welcomed the visitors. Expressing to the Manchester Juniors his best wishes for continued progress, Mr. Collinge referred to recent editorials and correspondence in the 'GAS JOURNAL.' They had created a great deal of interest, he said, Manchester Juniors, in particular, had always had the reputation of saying what they thought.

Mr. T. Nicklin, President, said the Association felt indebted to the West Lancashire Group for arranging the visit to Lostock Hall. It was the end point of what had been foreseen three years ago, and they had seen what could be achieved in a few years.

Mr. Collinge had spoken of freedom of speech and expression. He hoped members would continue to express their views even though, he supposed, there would not be full agreement with what was said.

Amid applause, Mr. Nicklin made special reference to Mr. A. Hodgson, another Junior who was 80, and also a founder member. He also greeted Mr. J. Grayston, Group Manager.

Mr. Evans was thanked for his talk on behalf of the Association by Mr. G. Gilden.

Change of Address

The Lancashire Dynamo Group sales office in Scotland is moving to new premises at 5, Woodside Place, Glasgow, C.3. Telephone: Douglas 0867/9.

British Vacuum

The British Vacuum Cleaner & Engineering Co., Ltd., announce a dividend of 10% for the year on ordinary shares. The net trading profit of the Group for the year, after taking credit for £65,000 carried forward as development expenditure, is £23,834. Group balance carried forward is £211,406.

AUSTRALIAN GAS LIGHT

Net profit of the Australian Gas Light Company for the year ended December 31, 1956, was £390,791 12s. 2d. A dividend of 3¼% was recommended, making 7% for the year, as against 6½% for 1955. Balance carried forward is £255,234 6s.

ATOMS FOR GAS MAKING?

Sir Harold Smith Poses a Question at Perth

Integration, Sales, Discussed at First Scottish Staff Conference

THE possibility that atomic energy might in the future be applied to the manufacture of gas was mentioned by Sir Harold Smith, Chairman of the Gas Council, when he spoke at the first annual staff conference of the Scottish Gas Board in Perth last week.

Sir Harold, in the course of a thumb-nail picture of the situation of the industry after eight years of nationalisation, said that their efficiency had improved enormously, the labour force was going down fairly rapidly, output had increased by 20%, although at the moment they generally had reached a position rather of stalemate. Costs had gone up enormously. The costs over which they had no control had gone up at the rate of £135 mill. a year, but they had only passed on to the consumer £120 mill. of that. 'We are now beginning to think that we ought not to have absorbed that £15 mill. Perhaps we should have set it aside to meet the costs of the replacement of capital plant which we have now to consider.'

Keen Competition

The gas industry had had to face keen competition, and now a factor in the situation was the development of atomic energy as a means of producing electricity. 'The progress that has been made, and the obvious encouragement that is being given to this development, is such that we have really got to think very hard as to what our future is going to be when electricity is generated at a price much lower than if it had been generated by coal. It is a problem that we have all got to be thinking of. We have got to meet a tremendous challenge. The day has gone when we can make our gas in our own little districts and sell it quite easily. Quite obviously we have got to alter our ideas completely on making and distributing gas. We can see the time coming when there has got to be a national grid. The whole picture is going to change . . . how soon, I don't know, but obviously it will have to change. Scientists are even thinking, is it possible for atomic energy to be applied to the manufacture of gas? They are beginning to see that there is a possibility.' Sir Harold added that research was being carried out on the complete gasification of small coals. It was possible that the atomic energy research people, when they got temperatures up to something like 1,000°C., might be able to assist there.

Gas Council Guests

Mr. Sydney Smith, Chairman of the Scottish Gas Board, presided at the conference, and was accompanied by his Deputy Chairman, Mr. D. D. Burns, and the following members of the Board: Lord Geddes, Lord Mathers, Mr. D. D. Melvin, Mr. C. Murdoch, and Sir Robert Nimmo. In addition to Sir Harold Smith, the Gas Council was represented by Sir Henry Jones and Mr. F. G. Brewer. Other guests included Mr. O. Francis, Under-Secretary to the Ministry of Power, and Mr. J. L. Warrander, Senior Scottish Officer to the Ministry of Power.

Following an official welcome from Lord Provost J. Buchan, Mr. Smith addressed the conference.

Mr. Smith said that the financial results for the past year were not yet available—'but I am glad to say that the indications are that we shall show a surplus for the year.' The past year had not been an easy one. Costs had continued to increase, the largest single item being the cost of coal. The increased costs to be met by the Board amounted to approximately £2 mill. Costs were continuing to increase. 'Unless we can effect more economies and sell more gas, there is a very great danger that we shall progressively price ourselves out of business.'

Capital Projects

Giving facts and figures of the Board's work, Mr. Smith mentioned that since vesting date the Board had expended £26 mill. on capital projects, the greater part concerned with manufacture and distribution. Progress made on grid systems and interlinkage mains last year enabled 13 manufacturing stations to be closed down on receiving bulk supplies of gas, bringing the total number closed down since vesting date to 52.

The value of appliances sold last year amounted to £1,453,000 as compared with £1,673,000 the previous year, a decrease of 13%. There was little doubt that the restrictions on hire purchase contributed materially to the drop.

Mr. Smith gave figures regarding the prospect card scheme introduced in November, 1956, under which all employees other than those engaged on sales, are entitled to a bonus in respect of sales resulting from the prospect cards submitted by them. The number of cards handed-in to the end of the financial year was 5,118. Of these, over 2,000 resulted in successful sales, 1,586 proved abortive, and 1,326 were still in abeyance at the end of April, pending decision by consumers. The estimated value of appliances sold as a result of the scheme was in the region of £45,000.

Returning to the question of costs, Mr. Smith said: 'It may well be that the sombre and terrifying procession of increases in the prices of one after another of the essential materials we use, will continue for some time to come. If that

Lord Provost J. Buchan points out a local landmark for the benefit of Sir Harold Smith, Sir Henry Jones, Mr. Sydney Smith, and members of the Board.

is to be, then our situation is, indeed, going to be serious. How can we be expected to keep our gas prices steady, much less reduce them, if the very things we must have to carry on our business continue to rise in price year after year? Were we the most efficient enterprise in existence, with all the goodwill in the world, we could do little against the blows which strike us hardest where we are the most vulnerable.

'How can we ourselves best tackle the vital problem of costs? We have achieved some quite useful economies, but it is possible to make more through further increases in efficiency. We must also plan to increase our revenues; not, except in the last resort, by placing the burden on our consumers; but by increased sales of gas, increased sales of coke and of appliances generally.'

Mr. Smith said that the question of tariffs had been under investigation for some time. An industrial tariff was also under consideration as a much-needed weapon to attract industrial loads. 'We may even go the length of considering seriously the introduction of a highly-promotional two-block domestic tariff.'

'Service and Sales'

In a reference to 'service and sales,' the Chairman said: 'From now on, the accent will be on "service." If our existing consumers are given a better service than they expect (and, frankly, in many parts of the area they have given up hope of ever getting service), they will come back to us because they are satisfied, and sales will follow with less effort.'

Concluding, Mr. Smith said: 'There are still many problems to be faced and solved. We must intensify our efforts by every possible means to keep down costs and to raise our standards of production, even where these are already high; and constantly to improve our service to consumers. Output per employee is a cogent factor, but we are assured of the active support of our particular trade unions in our efforts to improve efficiency. I think we have made some progress in our service to consumers, but there is plenty of room for improvement everywhere in the area.'

A paper on 'The Future Developments in Scotland's Coal Industry,' was given by Mr. H. R. King, Reconstruction Director, Scottish Division, National Coal Board. It gave an account of the development of the coal industry in Scotland, its prospects over the next decade, and the arrangements made under the Nationalisation Act for its management.

Coal Price Increase

Opening a discussion on the paper, Mr. D. D. Melvin, a member of the Board, recalled that soon after the First World War a major change in gasmaking methods was made in the majority of Scottish gasworks through the introduction of the continuous vertical retort. Such was the resultant economy that the inflationary increase in costs was overcome and in many places gas was sold at approximately pre-war price. Apart from welcome increases in plant efficiencies, no such major development had taken place after the last war, although their hopes were high that great changes were just in sight. Meantime, with coal costing around six times the pre-war price, an increase quite out of line with other commodities and costs, they were being priced out of their basic market. A change of policy was required on the part of the National Coal Board, which he suggested could be made by a literal interpretation of the duty whereby 'supplies of coal are made available at such prices as may seem to them best calculated to further the public interest in all respects.'

The gas industry, particularly in Scotland, was approaching a crossroads of technical development and might advance in several directions. Probably three main ways of development were open to them. Were they to make use of oil and oil products from the greatly expanding oil refinery at Grangemouth? Were they to develop on a large scale high pressure complete gasification processes for small coal? Or were they to obtain that free selection of coals of suitable quality to enable them to make a substantial and early contribution towards fulfilling the objects of the Clean Air Act? These aims could only be achieved by supplying householders with solid and gaseous smokeless fuel which would satisfy in quality and in cost. It might be they would require to venture along each of these avenues.

Mr. W. Nicol Baird, recently appointed General Manager of the Central Division, pointed to the differing objectives of the two nationalised industries. The coal industry was confronted with the vital problem of increasing production; the problem facing the gas industry was to obtain increased consumption. The compelling reasons behind both their efforts were exactly the same. Without increased coal production there would obviously be a steady increase in the price of that commodity since there was no other way of offsetting the large capital expenditure involved in the development programme envisaged. By the same token, if the gas industry did not obtain increased gas consumption the price of gas would inevitably be forced further up the spiral of rising prices and the demand for gas would fall off. The danger would inevitably then arise, of more coal requiring to be imported. The gas industry was probably the best friend the coal industry had at the present time. Not only did they utilise the coal received at twice the efficiency of the electrical industry, for example, but they were also in process of using gas from coke ovens, and augmenting supplies by drainage of methane from the coal mines. In these and other ways they were spinning out, in by far the most efficient manner, the limited or somewhat restricted production of coal at the present time. If it was not for the gas industry there was no doubt that the resulting increased coal imports would retard capital development everywhere and lower the standard of living throughout the country. With these thoughts in mind, he wondered if they could not persuade Mr. King to take back to his industry the suggestion that their services were really worthy of some very special encouragement. In spite of all the modern washeries that were being provided, they sometimes thought that these washeries were just part of the amenities at the pitheads for the miners, because they had to deal with coke customers who had some very hard things to say about the ash and stone content of coke.

Allocation on Merit

When the next inevitable rise in price of coal came to be considered, he would therefore ask Mr. King to put in a special plea on their behalf, stressing that the electrical industry required twice as much coal to do the same job of work as they could do and that the electrical industry was not only competing very hard with the Coal Board for the limited amount of capital available in the country, but that that industry had also, through their own tariffs, set a precedent, by charging the larger consumers more, so as to subsidise the smaller customers. He suggested that the very hard pressed Cinderella of a gas industry might be given an extension of that precedent, even if it only meant a share in the reduced summer price concessions. There was no doubt that from every point of view the gas industry had an extremely good case for a coal price standstill, if not indeed a reduction.

Platform eye view of the conference at the City Hall, Perth.

Mr. James M. Dow, recently appointed Coal and By-products Officer at the Board headquarters, said that it was gratifying to read that the proved coal reserves in Scotland were estimated to provide 400 mill. tons of gas coals over the next 80 years. This represented fully 150 years' requirements at the present rate of total usage of all coals for gas-making purposes. When might they expect to enjoy this happy position? At the moment the high percentage of low rank poor quality industrial coals (56%) which they were compelled to accept for gas making purposes was causing considerable concern to the industry and was one of the contributory reasons for the search for alternative fuel which was being undertaken at the present time. If they had to wait the best part of ten years for the better coals to come along, it was just possible that they would either have become used to carbonising these low rank coals or would have found a more attractive and less costly method of producing the gas therm from an alternative fuel. Mr. King would be well advised to note this, as a significant pointer from his paper would appear to be that the cost of winning coking and blending coals from the lower coal measures was likely further to increase their price to the consumer in the future. The gas industry was bound to be attracted to the process of oil gas manufacture, more especially when the capital cost of such plants was considerably less than that of coal carbonising plant.

Poor Preparation

Complaints regarding the poor preparation of coals despatched to gas undertakings were still far too common, and the continuance of undersized coal, particularly in the low rank grades, was a fault requiring immediate rectification.

The suggestion that certain pits might be put on base load working was a proposal well worth further consideration by the gas industry, as at the present time far too many varieties of coal were supplied to most Scottish gas undertakings, making control of blending a physical impossibility. The alternative, surely, was to carbonise a single coal of reliable quality at selected works, and if this practice would simplify the preparation and despatch of coal from the colliery it was well worthy of trial.

Following a paper on 'Stores Control' by Mr. A. F. Pollock, Joint Chief Financial Officer, Sc.G.B. headquarters, Mr. D. Beavis, Edinburgh, said that accuracy of coding and posting were probably more important than the actual method adopted. No system could provide the right answer unless the original documents properly and clearly described the intromissions, and there was room for doubt as to whether the calibre of stores employees was always such as to ensure this. It was equally important that the posting personnel should be experienced, and too frequent staff changes could do a lot of damage to any system. Standard nomenclature for components would help but was an ideal difficult of attainment when the gas industry and its main suppliers did not adopt uniformity.

Wide Range of Finishes

The wide range of finishes and minor variations in appliances gave rise too frequently to difficulty in giving sales staff information as to available stock. Optional extras on appliances gave even greater difficulty.

If maximum use was to be made of a stores control system, it must be used as a basis for ordering of goods. To make the system really work, the co-operation of all departments was necessary. Nor would a stores control system operate satisfactorily unless there was an efficient follow up of purchasing orders. Re-ordering levels were obviously vitally affected by delivery dates. In Edinburgh they had been putting a good deal more pressure on their suppliers in recent months, with good results. He could not resist the impression that he who shouted loudest got best service, and if stock values were to be kept in hand good progressing of all orders was essential.

The most important consideration of all was that the information must be posted up to date—indeed, up to the minute—at all times. That meant that suitable reserves of personnel must be available for holidays and sickness. Unless the records were up to date they were useless for re-ordering; they did not reveal available stocks of appliances to sales personnel; and they made the task of reconciliation with stock checkers' figures extremely difficult, if not impossible.

Dr. J. G. Davidson, Sc.G.B. headquarters, advocated the use of bin cards in store-keeping. He agreed that store keeping in itself had no value to an industry; what was done with it was really what mattered. Quite recently they had found out that someone had 37½ years of supply of stock of a certain item. That should never arise if one controlled the orders in relation to the rate of turnover. He also raised the question of an imprest system for small depôts handling stores.

Bin Cards

Mr. Pollock replied, on the subject of bin cards, that it was a controversial point whether they should keep a stores record in the office and a similar record in the stores. He agreed that if they kept two records, their system became to that extent more perfect; discrepancies were more easily traced, and control became more effective. It was, however, a luxury to some extent, and the question was whether they could afford it.

Mr. E. G. Smith, Glasgow, warned that stores control must never be allowed to interfere with service. If a system of stores control delayed delivery of an appliance, it was little comfort to tell the disappointed customer that while she might have had to wait for the article the Gas Board had an absolutely perfect form of stores control. There was a tendency for growth in stores control, and when that growth interfered with service they must examine their methods; service must be maintained before anything else.

In a paper on 'Capital Expenditure and Its Incidence,' Mr. D. D. Burns, O.B.E., Deputy Chairman of the Board, explained the capital structure of the industry and the incidence of capital expenditure, particularly the post-vesting expenditure of the Scottish Board.

Mr. Burns detailed the capital expenditure in each accounting period since vesting date—£1,536,419 at March 31, 1950, and £3,304,000 (provisional) at March 31, 1957. He also showed how the annual charges had increased in respect of interest and depreciation—from £1,033,310 at March, 1950, to £2,772,000 at March, 1957.

The capital expenditure approved for the Board for 1957-58 was in the region

of £3.7 mill., and for each of the two succeeding years (although these were still subject to review) the estimate was around the same figure.

The interest and depreciation charges were now increasing by over £300,000 each year and it was estimated that an increase of 3½% per annum in consumption would be necessary to meet this additional expense. This was on a restricted capital expenditure programme, and with any relaxation of the present stringency the burden of interest and depreciation charges might require a continuing increase in consumption of about 4% per annum. Unfortunately they were not getting that increase—they were going the other way. There had been a progressive fall in domestic consumption from 122 therms per consumer in 1950-51 to 104 therms in 1955-56. Indeed, if it had not been for an increase in industrial and commercial consumption the overall picture would have been much worse.

This fall in consumption per domestic consumer must be viewed with grave concern. In order to improve present production plant in certain places, meet potential demand, better present consumer facilities, and service new housing estates, they were faced with an increase of over £300,000 each year in respect of capital charges. A penny per therm on gas sales was equal to just over £800,000 so that they were committed to a rise of nearly .4d. per therm every year so long as the present rate of capital spending went on. The alternative to that rise going on to the price of gas, apart from what savings could be achieved by increased efficiency, or by cheaper alternative sources of supply, was an increase in consumption each year.

Works Study

A complete session of the conference was devoted to the subject of works study, papers being given by Mr. G. H. Case, Imperial Chemical Industries Ltd., Huddersfield, on 'The Application of Works Study from the Management Point of View' and by Mr. P. Fisher, Trades Union Congress, London, on 'Trade Unions and Works Study.'

Referring to a comment by Mr. Fisher on redundancy, the Chairman recalled that since vesting day the Scottish Gas Board had closed down 52 manufacturing stations. That might have raised serious problems of redundancy, but with the excellent co-operation of the Trade Unions they were able to close down these undertakings without a single case of hardship. Mr. Fisher had also made a reference to works study in the Board-room. Curiously enough, a recent meeting of the members of the Board dealt with this particular matter in relation to themselves. They were able, through so doing, to get through quite as much business, deal with several important matters, and be able to cut the length of their meeting by about 33⅓%.

Mr. A. M. Donnet, N.U.G.M.W., referred to certain bonus schemes that had been instituted in Glasgow and Edinburgh and said that they were working smoothly, though certain problems had arisen that required give-and-take on both sides. It was a continuing manifestation of something that the Scottish Gas Board was doing as successfully as private industry. It also showed that the gas industry, through the co-operation of all parties concerned, had succeeded in doing something not considered feasible by the American gas industry, as indicated by the Productivity Team's report. The Board had shown foresight and initiative and had given the Unions an opportunity to secure the co-operation of all the work-people concerned. This was no mean feat. It had worked to mutual advantage.

Support of the Unions

Mr. H. R. Hart, General Manager, Glasgow Division, said that they were indebted for the support the Unions had given in the pursuit of increased productivity. It was gratifying to know that the men themselves were pleased. From the Board's point of view the most satisfactory aspect of the whole business was the increased productivity achieved. They had been able to switch men to the work of selling. In that way, without addition to staff or increased costs, they had been better able to pursue their proper task. Works study, he said, was tending to produce specialists and a specialist technique. He hoped these specialists would try to forget jargon. Much of the resentment surrounding works study techniques had grown out of the use of words like 'works study' and 'time and motion study.' From a similar cause automation had had a tragic introduction to industry.

Mr. W. B. McArthur, N.A.L.G.O., stressing that they should not be exclusively concerned with the problems of their own industry, suggested that they might consider whether it might not be well to pronounce from a conference of that nature their feeling that within the actual Ministry of Power itself there should be an overall appreciation of the various parts that made up the public service of the Ministry. He felt that a national economic plan for the Ministry itself was required, for much of their attention to their own duties would be nullified if they could not have more control over circumstances over which at present they had no control. He suggested that they might support a constructive suggestion that when it was timely a Royal Commission should investigate the operation of the independent members of the family of the Ministry of Power as a whole.

He was sure it would produce good economic results; it would cancel out a lot of frustration and eliminate a lot of wasteful energy and competition.

Presenting a paper on 'An Appreciation of Service and Sales in Scotland,' Mr. R. H. Bone, Commercial Manager, Scottish Gas Board, said that the paper was based on the firm belief that in Scotland they were progressively acquiring the resources they needed to halt the serious recession in their domestic business, and to take full advantage of the many new opportunities opening up before them in this and many other fields. It was also based on the firm belief that their loss of consumers was to some extent due to their own failure to get the knowledge of the advantages of gas service and gas appliances over to the public. He was convinced that there were thousands of people in Scotland now who could spend money on their goods and services if they knew more about them.

The challenge of the situation in Scotland was that it called upon them to evolve their own special technique to deal with it. Part of this technique must be for every one engaged in service and sales to make themselves familiar with their local situation, with the different social levels and income groups, with the communal influence and personal characteristics of groups and individuals within their districts. Only by such detailed and continuous study of the background could they discern where the most fruitful efforts to promote their services could be made.

Availability of money was not the only factor. There were innumerable factors in the circumstances of every individual consumer which were, or could be made, effective in determining their choice. Whatever advantages competitors might claim would be to the detriment of gas only when those who could afford to be discriminating were not fully aware of the special characteristics and quality which could be provided by gas and gas appliances, and the service that went with them.

Lost Therms

They had for various reasons over the past six years lost 18 therms per domestic consumer. It would take time to halt the recession, but, essential as it was to halt it, they could not afford to concentrate on that task alone. They must, at the same time, go out and get new business. The most immediate and fruitful results could be obtained by going all out for the domestic hot water load. It should not be overlooked that the Clean Food Act provided a wonderful opportunity to extend this market. Their next best friend might very well be the gas poker; there was a very great scope for increased consumption. Regarding space heating, recent technical developments had given much hope for the future. It might well be that local authorities would be very ready to consider the installaton of gas fires to existing fireplaces in order to meet requirements under the Clean Air Act. The results of the current gas-washer campaign were most encouraging; they seemed to indicate that there they had a winner. Gas refrigeration was still comparatively unknown in Scotland. But the most valuable commodity they had to sell, and the one which was most profoundly appreciated in the long run, was service. Service was always the best investment.

Commenting on a statement by Mr. Bone that 40% of Scottish consumers had no running supply of hot water, Dr. J. G. Davidson, Joint Chief Financial Officer, asked if any serious attempts had been made to heat saddleback boilers by gas. Mr. Bone said that he had no personal knowledge of any dual-purpose appliance meeting these requirements.

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Mr. A. Whipp, N.U.G.M.W., referring to the shortage of gas fitters, said that the only people who could be exonerated were those who had come into the industry since nationalisation. No real systematic attempt was made to train and recruit people for this particular work. A great deal more had got to be done in this direction, though the Union appreciated what had been done in recent years. There had been a tremendous improvement, but there was room for a great deal more, particularly in regard to intensive recruitment and development and the utilisation to a far greater extent of maintenance personnel. He hoped managers would use all their endeavours to aid recruitment and end the plumbing undertaking menace as far as possible.

The Chairman agreed that they had had considerable co-operation with the Unions with whom they had negotiated. They would like to extend it, but there were difficulties. As far as the Scottish Gas Board was concerned, the one thing they would like to see settled was the lack of co-operation between Unions in the gas industry and the plumbers' Trade Union. A lot had been done in many parts of the country to recruit gas fitters and more was being done in training. If they could get a continuation of the co-operation with the Trade Unions, they hoped in time to overcome the difficulties in regard to the shortage of gas fitters.

New Prospects

Mr. D. C. Elgin, Board Technical Official, asked if they sent out leaflets on things like water heaters to consumers who had just bought other appliances, and if they sent out special leaflets to those consumers who might be thought to be in the higher income groups. Did they follow up enquiries that had at first proved unsuccessful? Did they try adequately to link up gas-selling publicity with the publicity about appliances generally? Mr. Bone replied that the questions would be borne in mind.

Mr. H. S. Milne, Aberdeen, raised the question of the real effects on decreased consumption per consumer of the installation of modern equipment. He said that he had seen it stated that half of the decrease per consumer could be accounted for by increased efficiency of the appliance. The small cheap portable oil heater, he added, was having a considerable effect. Was industrial heating receiving sufficient attention? He found that mobile showrooms were extremely useful in his area; the consumer in a housing area was often very loath to go into town to visit a showroom and would far rather visit a mobile showroom in the area.

Mr. Robert Fife suggested various reasons for the reduction in consumption since 1951, including the number of houses which had been built with back boilers, the many tenants with hire purchase commitments which prevented them indulging in other necessities, and the fact that gas showrooms were often out of date and badly positioned

Mr. T. Smith, Divisional Sales and Service Superintendent, Edinburgh Division, spoke of the recruitment of salesmen pointing out that trained fitters with an aptitude for selling were in short supply and that the practice of bringing in men from outside was overflowing with snags. Good types were hard to get and the gas industry was seldom looked upon as an attractive proposition. They had had some sharp lessons concerning dealer trading but he was still convinced that this business could be developed.

Feminine Voice

Miss Sheila Macdonald (Glasgow) complained that Mr. Bone had made only passing reference to home service advisers who, she felt, had never been given a real chance in Scotland. They were enthusiastic but their enthusiasm was liable to be damaged unless the Board could give them more help, guidance and publicity. A home service adviser's life was spent in meeting consumers and it must be remembered that 5,000 women attended demonstrations during the past year. Could not the Board arrange for live appliances for the housewife to see, and provide the home service staff with a neat demonstration unit instead of the usual allocation of one cooker, one table and one hamper?

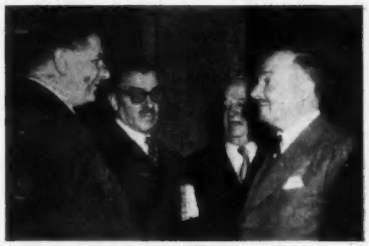
Mr. T. S. Ricketts, the Board's Chief Engineer, then gave his paper 'Integration Study,' which will shortly be reproduced in the 'GAS JOURNAL.' Commenting on this Mr. C. J. G. Cox, Edinburgh Divisional Engineer, felt that the plan did not go as far as it might and that more works might be closed down with advantage. Much the same view was taken by Mr. Nicol Baird who said he had learned that the coke oven supply to Carlisle could possibly be increased by 1 mill. cu.ft. of gas per day, and if this was so it might be worth considering a linkage from Carlisle to Dumfries to tie up with a local integration scheme there. It seemed inevitable that gas available in Carlisle at possibly 9d. per therm could be more economically distributed in the South of Scotland than gas produced from the local plant at Dumfries. He would also have liked to see a connection between Dundee and Aberdeen since the proposed integration schemes based on these two cities would at their extremities be almost contiguous, and with the increasing dependence on coal supplies from the Fife area it would appear that such a link might be both practicable and economical since all coal to Aberdeen had to be transported considerable distances.

New Inspirations

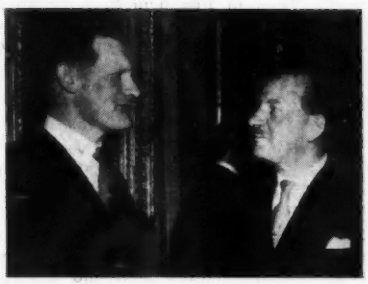
Proposing an omnibus vote of thanks Mr. H. R. Hart, Glasgow Divisional General Manager, said it was not without significance that the conference had been called at the present time when large-scale organisation was taking place within the Board and managers must re-orientate themselves and find new loyalties. It was appropriate that the Scottish Gas Board had returned to the ancient city of Perth and had found there new inspirations. In closing Mr. Hart paid tribute to the work done by the Secretary of the Board, Mr. A. T. Herd, and his staff, who had organised the conference.

I.G.E. Meeting

Below are four candid camera conversations which overflowed our Institution Number last week. Like all I.G.E. photographs they were taken by our Staff Photographer, Stephen Tennant, A.R.P.S. Prints are available from Walter King Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.



Mr. S. H. Stokes (Scunthorpe) with Messrs. J. and F. Drake and (behind) Mr. H. Saville.



Messrs. Syme (Parkinson) and Hibberd (New Zealand).

Mr. L. W. Andrew (Director, Watson House) with Dr. H. A. Blum.

Mr. Dereck Wilson (George Wilson) and Mr. W. B. McLusky (Leeds).

From a paper to the Manchester Juniors, Manchester, April 25, 1957.

The Use of Alignment Charts in the Control of Production Processes

By N. HARE, A.M.I.Chem.E., Assoc.M.Inst.Gas E.

ASSISTANT PRODUCTION ENGINEER, NORTH WESTERN GAS BOARD.

IT is not always easy to cater in the ideal way for the diverse circumstances which may arise at production stations. Time is an important factor and very often it is necessary for a station engineer to make a decision or judgment based upon previous experience. It is evident that a decision or judgment based upon experience alone will always be second best to a decision taken upon reasonably accurate knowledge or a combination of both knowledge and experience.

By the use of mass and energy balances of various forms it is generally possible to forecast the effects of decisions made, but this is a time-consuming process and explains why the proportion of decisions taken upon past experience remains high. It is in this field that the alignment chart is useful since, being a pictorial representation of a mass or energy balance or both, it allows of quick accurate decisions based upon fact rather than the intelligent guesswork associated with decisions based upon experience.

Carbonisation

An alignment chart can be used for the estimation of the gas and tar yields from a coal, based upon a knowledge of the calorific value of that coal and its fixed carbon content. Trials have shown that the system of estimation was normally within one therm per ton of the results obtained when producing gas at a C.V. of 450 B.Th.U. per cu.ft. into holder from a steamed C.V.R. installation and when corrections, as necessary, were made for deviation from the standard figure of 12% total inerts in the gas into holder.

A secondary diagram enables an estimation of the yield of gross dry coke and breeze to be made, and is based upon the fixed carbon plus ash in the coal as received. These diagrams assume a total inerts content of 12% in gas into holder and it is considered that this is a realistic figure which should be achieved with good practice in the operation of steamed verticals and in subsequent gas purification.

It is assumed that the ratio of gaseous therms to tar therms is constant for all coals when these are carbonised under accepted good practice conditions in vertical retorts. This ratio is taken as tar in gallons per ton is equal to 0.2 times the gaseous therms per ton and experience confirms this assumption. The volatile therms per ton potentially available from a particular coal, excluding the fact of steaming the charge, appear after carbonisation as gas and tar. They may be considered as the total therms present originally in the coal less the thermal value of the fixed carbon. The calorific value of fixed carbon is taken as the calorific value of pure carbon and, consequently, in the case of two coals having the same calorific value, but possessing a different fixed carbon content, the one containing the lower percentage of fixed carbon would upon carbonisation be expected to give the better gas yield. The gross coke and breeze production on the dry basis resulting from the carbonisation of a particular coal is taken to be proportional to the fixed carbon plus ash in the coal as received. It is reasonable to assume that within the limits considered this relationship is fixed for all coals which are normally carbonised, but will, of course, vary with the calorific value of the gas produced.

The carbonisation reaction is considered to be thermally neutral and the heat required for endothermic water gas production within the retort is supplied by combustion of producer gas in the external flues. Hence the thermal output of gas, tar and coke may be equated with the thermal input as coal. It is, however, assumed that some 1% of the total calorific value of the coal is inadvertantly lost, for example, when the discharger doors are open due to ingress of air, and occasional leakage, etc., on a setting in an average condition.

The following expressions were found applicable with a good degree of accuracy in estimating probable results when steaming down to a C.V. of 450 B.Th.U. per cu.ft. into holder at 12% inerts in gas on a C.V.R. installation.

$$Hg = 0.727\ (Hc - 3.25\ FC - 3).$$
$$C = 0.2\ (FC + A) + 0.2.$$
$$T = 0.2\ Hg.$$

Where Hg = gaseous therms per ton (on coal as received basis) at 450 B.Th.U. per cu.ft. to holders.

Hc = calorific value, coal as received basis in therms per ton.

T = tar, as gal. per ton (on coal as received basis).

C = gross dry coke and breeze as cwts. per ton (on coal as received basis).

FC = percentage of fixed carbon in coal as received.

A = percentage of ash in coal as received.

It will be noted that these expressions relate specifically to a calorific value of 450 B.Th.U. per cu.ft. into holder. If it is assumed that B.W.G. generated in continuous vertical retorts has a calorific value of 300 B.Th.U. per cu.ft. then it is possible to correct the above to calorific values other than 450 into holder, under which circumstances the following expression is applicable.

$$0.265\ Hg + \left[\frac{CV.Hg}{4.08\ (CV - 300)}\right] = Hg_A$$

Where Hg = gaseous therms per ton at a C.V. of 450 B.Th.U. per cu.ft. into holder.

CV = actual calorific value of gas into holder in B.Th.U. per cu.ft.

Hg_A = gaseous therms per ton at the actual calorific value into holder.

Similarly, the dry coke and breeze at a calorific value other than 450 B.Th.U. per cu.ft. is given by:—

$$C_A = C + 0.044\ (Hg - Hg_A).$$

Where C_A = dry coke and breeze gross at actual calorific value into holder.

C, Hg and Hg_A are defined above

and the tar yield given by:

$$T_A = 0.2\ Hg_A.$$

Where T_A = expected tar, gal. per ton, at actual calorific value.

The relationship between H.E.V., total inerts, gas yield, and gaseous therms per ton at a calorific value of 450 B.Th.U. per cu.ft. may be shown diagrammatically and it is merely a graphical representation of Pexton's equation for the calculation of H.E.V.

$$E = \frac{V}{100{,}000}\left[H - 318\left(1 - \frac{N}{100}\right)\right]$$

E = Hydrocarbon enrichment value in therms.

V = Volume of purified gas, cu.ft. per ton of coal.

H = Calorific value of the purified gas, B.Th.U. per cu.ft.

N = Total inerts content of purified gas, vol. per cent.

It is considered useful since it clearly illustrates the marked effect of unnecessary inerts in gas into holder and it is a ready means of estimating what improvement in gas yield would result from, for example, a reduction in air to purifiers, or a reduction in air ingress at top castings, etc., since under

these circumstances the H.E.V. could be considered as remaining constant.

Thus, for example, a C.V.R. installation which has 15% total inerts in gas into holder, at an H.E.V. of 34, would give 85.2 therms per ton, whereas if the inerts were reduced to the better figure of 12% then the gas therms per ton would be increased to 90.

When B.W.G. is generated in a steamed vertical retort a small portion of the heat requirement of the water gas reaction is supplied by the sensible heat of coke as it cools from the carbonisation finishing temperature to 800°C. At this latter temperature it is generally accepted that the amount of water gas reaction occurring becomes negligible. Sensible heat recovered from the coke will, of course, also preheat the steam admitted to the retort. It can be argued that were it not for the admission of steam the sensible heat of the coke would be unavoidably lost. However, it can be shown that the quantity of B.W.G. resulting from heat recovery from coke is small when compared with the total production of B.W.G. in a vertical retort steamed down to 450. Moreover, it is almost certain that with the addition of the minimum quantity of steam required to maintain bottom castings in a cool condition, sufficient steam will have been admitted to recover the sensible heat in coke between 1,000°C. and 800°C. as heat of reaction demanded by the blue water gas produced.

The sensible heat associated with the coke resulting from the carbonisation of 1 ton of coal as this coke is cooled from 1,000°C. to 800°C. is some 150,000 B.Th.U. If all this heat were available as heat of reaction for blue water gas production, then this is equivalent to the gasification of some 30 lb. of carbon requiring 90 lb. of steam at 50% steam decomposition. This is equivalent to the admission of some 4 to 5% of steam, a figure generally accepted as being a minimum requirement for maintaining bottom castings in a cool condition. It is reasonable, therefore, to assume that the quantity of B.W.C. associated with 4 to 5% steam admission is unavoidably produced. Any other B.W.G. produced in the vertical retort will require reaction heat to be supplied from the flues through the wall of the retort. The cost in coke of blue water gas produced this way, is that equivalent to the carbon appearing in the blue water gas, plus the coke required as producer fuel in order to supply the reaction heat.

Reaction Heat

Steam which reaches the heated section of the retort has previously been preheated to 1,000°C. by the sensible heat recovered from the cooling coke. Some of this superheated steam reacts with coke at 1,000°C. in the heated section to give water gas. The undecomposed steam passes up the retort and gives up sensible heat to the charge (as does also the B.W.G. produced) as it cools to the offtake temperature of, say, 300°C. With 50% steam decomposition assumed, then the net reaction heat which must be supplied through the retort wall (i.e., from producer gas) is 12,500 B.Th.U. per therm of B.W.G. generated in the retort.

If reaction heat is supplied by producer fuel at 40% efficiency then carbon to producers

$$\text{equals } \frac{12{,}500}{14{,}400 \times 0.4} \text{ or 2.2 lb. approx.}$$

The carbon gasified per therm of B.W.G. is 5 lb. thus the equivalent coke per therm of B.W.G. generated within the retort equals:

$$\frac{5 \times 100}{(100 - M)} + \frac{2.2 \times 100}{(100 - M - A)}$$

where M = the moisture content and A = the ash content of the coke fed to the producers. This expression simplifies to:—

$$\frac{72{,}000 - 720M - 500A}{10{,}000 - 200M - 100A + M^2 + MA}$$

approximating for $M^2 + MA$ which cannot materially affect the answer by more than the odd per cent. and putting $M^2 + MA$ equals 100 we have coke per therm

$$\text{equals:—} \quad \frac{72{,}000 - 720M - 500A}{9{,}900 - 200M - 100A}$$

A nomogram can be drawn, based on this expression.

A nomogram may be used to estimate the weight of steam raised in waste heat boilers per lb. of carbon gasified in the producers associated with such boilers. The basis of such a diagram is discussed below, but it must be stressed that it is applicable only to waste gases ideally resulting from the combustion of producer gas, or those gases which contain the ideal combustion products, plus excess air. In installations having serious retort leakage, this nomogram would not apply. However, in this connection, it is still useful in indicating whether or not, for example, serious leakage of B.W.G. is occurring from the steaming zone of a C.V.R. installation. If this is the case, then the actual quantity of steam raised would be higher than that indicated by the nomogram and it is a relatively simple matter to calculate back the extent of such leakage. Alternatively, in an installation operated with excessive pull at retort offtakes and where inleakage of waste gases resulted, the actual steam raised would be lower than that indicated by the nomogram.

It will be seen that the waste heat boiler may be used as a calorimetric guide to retort conditions. In the broadest sense, operating conditions approach correct values as the actual weight of steam raised per lb. of carbon gasified approaches that calculated from the nomogram.

If there is no retort leakage and the waste gas analysis is theoretical for combustion of producer gas, or a mixture of such theoretical combustion products and excess air, then: (1) All carbon gasified on producers appears as CO_2 in the waste gases; (2) all water introduced either as moisture in coke, steam, or evaporated in the grate appears as water vapour in the waste gases; and (3) hydrogen present in coke results as a mixture of water vapour and nitrogen in the waste gases.

Effect Small

It can be shown that the effect of the hydrogen normally present in the high temperature coke fed to producers is small.

In a typical case, it might alter the calculated value of steam raised by some 2½% when the hydrogen content is as high as 1% in the producer fuel. This item will, therefore, be ignored. Hence the weight of theoretical dry waste gas is proportional to the carbon gasified, the weight of water vapour equals that under (2) above and any excess air present may be calculated from the dry basis CO_2 content of the waste gas. These separate components of the waste gas give up heat to the boiler as they are cooled to the waste gas outlet temperature.

The total heat given up appears as: Steam raised—total heat above feedwater temperature, radiation and/or convection losses from the boiler and heat losses as boiler blowdown.

Let W_s = steam raised in lb. per hour,
W_g = weight of waste gas in lb. per hour,
$\triangle t$ = temperature drop of waste gas across boiler in °C.,
n = number of boilers working,
H_l = heat loss from one boiler, in B.Th.U. per hour,
H_s = total heat of steam above feed water temperature in B.Th.U. per lb.,
H_b = heat loss as blowdown, B.Th.U. per lb. of steam raised,
C_p = mean specific heat of waste gases within range of t in B.Th.U. per lb. per °F.,
W_c = weight of carbon gasified in lb. per hour,
CO_2 = percentage of CO_2 by volume in waste gas, dry basis.

Then we can write:— $$W_s = \frac{W_g C_p \triangle t \times 1.8 - nH_l}{H_s + H_b} \qquad (1)$$

The weight of CO_2 in the waste gas is given by:— $\frac{W_c \times 44}{12} = 3.67\ W_c$. The nitrogen associated with this CO_2 in a theoretical waste gas weighs 8.84 W_c lb. The weight of excess air present in any actual flue gas is related to the weight of carbon gasified, and in a similar manner may be expressed in terms of W_c. The heat given up during the cooling of this mixture of gases will depend upon the specific heat of the various gases in the mixture over the range of temperatures considered. Assuming that the true specific heat of gases at 425°C. is generally representative of the mean specific heat applying when waste gases are cooled through the usual range met in waste heat boiler practice, then it is possible to express nitrogen, water vapour, and oxygen present in the waste gas as equivalent CO_2 for purposes of estimating the heat carrying capacity of the gases.

Upon the above basis the heat carrying capacity of the dry

gases expressed as equivalent CO_2 is shown in the table below.

Percentage by volume of CO_2	Theoretical Flue Gas		Weight Excess Air	Total heat carrying capacity expressed as equivalent CO_2
	Weight CO_2	Weight N_2		
21	3.67Wc	8.84Wc	0.0Wc	12.22Wc
18	3.67Wc	8.84Wc	1.91Wc	14.04Wc
16	3.67Wc	8.84Wc	3.58Wc	15.63Wc
14	3.67Wc	8.84Wc	5.73Wc	17.67Wc
12	3.67Wc	8.84Wc	8.59Wc	20.40Wc
10	3.67Wc	8.84Wc	12.60Wc	24.21Wc

In the case of the water introduced into the producer, the mean specific heat of the water vapour over the more usual temperature drop across the boiler is 0.5 B.Th.U. per lb. If w is the weight of water in lb. per lb. of carbon gasified (total water includes steam admitted, water evaporated on grate, and moisture in coke), then the CO_2 equivalent to this water is:

$$\frac{0.5\ wWc}{0.272} = 1.85\ wWc$$

(where 0.272 is the specific heat of CO_2 at 425°C.)

Thus we can write:—

$$W_s = \frac{1.8 \times 0.272 \triangle t\ (fCO_2 + 1.85w)\ W_c - nH_1}{H_s + H_b}$$

or

$$W_s = \frac{0.49 \triangle t\ (fCO_2 + 1.85w)\ W_c - nH_1}{H_s + H_b}$$

(where fCO_2 is some function of the dry basis CO_2 content of the waste gas taken from the above table). There are two terms in the above expression which cause unnecessary complication. These are nH_1 and H_b. Evidently the value of H_1 will vary with the boiler size, steam temperature, and location of boiler, etc. Moreover, the relative effect expressed as a percentage of the steam raised will increase as the steam generated per hour by a boiler falls. Since most waste heat boilers work at a steady load, frequently approaching their rated capacity, it is considered sufficiently accurate to assume that 95% of the theoretical heat given up to the boiler appears as steam when the expression simplifies to:

$$W_s = \frac{0.49 \times 0.95 \triangle t\ (fCO_2 + 1.85w)\ W_c}{H_s + H_b}$$

Consideration of the value of H_b will show that with a boiler operating at 100 lb. per sq. in. gauge saturated steam, with 5% blowdown and a feed water temperature of 180°F., then the error involved in neglecting H_b is 0.75%. This is very small and it will generally be sufficiently accurate to increase the value of H_s by 1% in order to allow for blowdown heat loss when the expression becomes:

$$W_s = \frac{0.46 \triangle t\ (fCO_2 + 1.85w)\ Wc}{H_s}$$

This last expression forms the basis of the nomogram.

It must be noted that in using this nomogram, values for H_s should include superheat when a superheater is fitted, and $\triangle t$ should be the temperature drop in waste gases from just prior to the superheater to outlet boiler.

Ash Content

The coke used in the gas industry for the manufacture of producer gas is generally high temperature coke and, although it contains a small amount of volatile matter, where this is low, the effect of the hydrogen content of the coke is small and it is assumed safe to consider the sum of the fixed carbon plus volatile matter as fixed carbon. The seriousness of loss of carbon in ashes will depend upon the ash content of the coke fed to the producer and the fixed carbon content of the pan ash. Although it is not necessarily true that all the ash, as determined in the proximate analysis, will necessarily appear in the pan ash removed from the producers, it is very nearly true to assume this.

With these assumptions it can be shown that the loss of coke due to removal of fixed carbon with pan ash, expressed as a percentage, is given by:

$$\frac{100\ A_f FC_a}{A_a\ (FC + VM)_f}\ \%$$

Where A_a = the ash content of the pan ash (or 100 − FC_a) dry basis.

A_f = the ash content of the coke fed to producers wet basis.

$(FC+VM)_f$ = the fixed carbon plus volatile matter in the coke fed to producer wet basis.

FC_a = the fixed carbon content of the pan ash dry basis.

An alignment chart has been prepared on a graphical representation of this expression.

The main reactions occurring in the producer are:—

$$C + O_2 = CO_2$$
$$C + H_2O = CO + H_2$$
$$C + \tfrac{1}{2}O_2 = CO$$

The calorific values of carbon monoxide and hydrogen are for practical purposes identical and will be assumed at 320 B.Th. U. per cu.ft. Under these circumstances it will be seen that 1 lb. of carbon can react with oxygen to give: —

$$\frac{380 \times 320}{12 \times 100{,}000}$$ or 0.1 therms of cold gas

and in a similar way 1 lb. of carbon can react with steam to give:—

$$\frac{380 \times 2 \times 320}{12 \times 100{,}000}$$ or 0.2 therms of cold gas.

It is clear that in operating a producer the cold gaseous therms per ton of coke will vary with the hydrogen and CO_2 contents of the gas produced, and the fixed carbon plus volatile matter in coke charged to the producer.

Since all the carbon gasified in the producer appears in the producer gas and since one volume of hydrogen is associated with an equal volume of carbon monoxide in the gas produced from the water gas reaction, the thermal yield per lb. of carbon gasified is given by:—

$$\left[\frac{\%\ H_2}{\%\ (CO_2 + CO)}\right] \times 0.2 + \left[\frac{\%\ (CO - H_2)}{\%\ (CO_2 + CO)}\right] \times 0.1$$
$$= 0.1 \left[\frac{\%\ (CO + H_2)}{\%\ (CO + CO_2)}\right]$$

The ratio

$$\frac{CO + H_2}{CO + CO_2}$$

has been found to vary with the steam:carbon ratio. From the above basic expression and from estimates of this ratio a diagram has been prepared to show the relationship between thermal yields and (FC + VM) in fuel fed to the producer (corrected for losses due to carbon in pan ash) at various steam carbon ratios.

In the manufacture of water gas it is of interest to know:

1. The relationship between total inerts in the gas, oil consumption, calorific value of final gas, and the percentage of B.W.G. expressed in therms of the total gaseous therms produced;

2. the oil gas in therms per gal. of oil used or alternatively the change in oil demand with calorific value of final gas;

3. the B.W.G. expressed in therms per ton of coke produced or per lb. of carbon gasified.

Given a knowledge of—

(a) The oil used per 1,000 cu.ft.,
(b) the calorific value of final gas,
(c) the percentage of (F.C. + V.M.) in the coke fed to the generator,
(d) the coke used per 1,000 cu.ft., and
(e) the total inert content of final gas.

The unknowns mentioned in 1, 2 and 3 above may be estimated from previously drawn diagrams. This information is of course that required to measure the efficiencies of B.W.G. production, of carburation, and to forecast the result of varying coke quality or change in the total inerts content of final gas.

It is assumed that each gallon of oil produces 70 cu.ft. of oil gas and that the calorific value of inert free B.W.G. is 325 B.Th.U. per cu.ft.

Let

a = coke per 1,000 cu. ft. of gas—lb.
b = oil „ „ „ „ „ „ —gal.
c = calorific value of gas—B.Th.U./cu.ft.
d = total inerts content of gas—%.

Then

$$\frac{\text{B.W.G. in therms}}{\text{total gaseous therms}} = \frac{325(1000 - 70b - 10d)}{1000c} \quad \%$$

$$\text{or \% B.W.G. in therms} = \frac{1}{c}\left[325 - 22.75b - 3.25d\right] \quad \text{—(A)}$$

Oil gas in therms per gal. of oil

$$= \frac{\text{(oil gas in therms per 1000 cu. ft.)}}{\text{(oil used gal. per 1000 cu. ft.)}}$$

$$= \frac{(100 - \text{\% B.W.G. in therms})\, c \times 1000}{100 \times b \times 100{,}000}$$

$$= \frac{(100 - \text{\% B.W.G. in therms})\, c}{10{,}000\, b} \quad \text{—(B)}$$

B.W.G. in therms per lb. of coke

$$= \frac{\text{\% B.W.G. in therms} \times 1000 \times c}{100 \times 100{,}000 \times a}$$

$$= \frac{(\text{\% B.W.G. in therms})\, c}{10{,}000\, a} \quad \text{—(C)}$$

Similarly B.W.G. in therms per tons of coke

$$= \frac{2240\,(\text{\% B.W.G. in therms})\, c}{10{,}000\, a} \quad \text{—(D)}$$

And B.W.G. therms per lb. carbon + volatile matter

$$= \frac{(\text{\% B.W.G. in therms})\, c}{100\,(FC + VM)} \quad \text{—(E)}$$

Where FC = percentage of fixed carbon in coke to generator.
VM = percentage of volatile matter in coke to generator.

Diagrams have been drawn from the expressions A and B, while the expressions C, D and E form the basis of a third. In this way information may be obtained from the first two diagrams for the production of either B.W.G. or C.W.G., but the third only applies to C.W.G. manufacture. Their use leads to a quick appraisal of generator and carburetter conditions.

The station engineer is faced with the problem of operating an existing ammonia washer to the best advantage. First and foremost he must ensure that the ammonia passing forward to purifiers is always within the required limits. In achieving this end, the quantity of washing medium supplied for any given gas flow, at any given temperature, could gradually increase and may escape notice. What is therefore required, is a system for quickly checking the performance of the washer.

The most convenient method to achieve this end is to calculate the qk of the scrubbing operation (where q is the quantity of washing medium per cu.ft. of gas, and k is the partition co-efficient of ammonia between liquid and gas under equilibrium conditions). The minimum value of qk at which any given scrubber will operate is determined by the original design of the scrubber, and the usual values for qk are 1.3-1.6 when qk is calculated by the method given below. Thus if periodic checks on a scrubber show that qk is rising, then it is certain that some fault is developing within the washer.

From a knowledge of the qk calculated for an existing washer it is possible to estimate the water requirement at different gas conditions. Nomograms have been prepared for estimating qk, and water requirements under varying gas conditons. The basis on which they are constructed depends upon the following calculations.

The actual quantity of washing medium required is fixed by various factors, such as gas flow, concentration of solute to be removed, wetted surface available for absorption, the efficiency of wetting of this packing, gas temperature, and concentration of other interfering components in the gas stream, such as CO_2, etc.

Challis obtained the following expression:—

$$Ge = \frac{0.001158\ C^{1.15}\ T^4}{(408+P)\ (CO_2)^{0.75}}$$

where Ge = equilibrium vapour pressure of ammonia (grains per 100 cu. ft.),
P = gauge pressure (in. W.G.),
C = strength of liquor (percentage of free NH_3 w/w in the strong bay),
T = temperature °F, and
(CO_2) = concentration of CO_2 in the crude gas expressed as a percentage by volume.

The effect of P in the range common in gasworks' practice is negligible and the expression will be simplified by taking P equals 22 as typical when the expression becomes:—

$$Ge = \frac{0.001158\ C^{1.15}\ T^4}{430\ (CO_2)^{0.75}}$$

$$\text{Thus } \frac{Ge}{C} = \frac{0.001158\ C^{0.15}\ T^4}{430\ (CO_2)^{0.75}}$$

but k, the partition co-efficient, equals the concentration of ammonia per unit volume of liquid divided by the concentration of ammonia per unit volume of gas at equilibrium.

$$\text{Thus } k = \frac{C \times 7{,}000 \times 62.4}{Ge}$$

$$k = \frac{430 \times 436{,}800 \times (CO_2)^{0.75}}{0.001158 \times C^{0.15} \times T^4}$$

If W = gal. of water supplied to the scrubber per hour
and
V = volume of gas passing through the washer in cu. ft. per hour,

Then q is defined as $\frac{W}{6.24V}$

From this it follows that:—

$$qk = \left[\frac{(CO_2)^{0.75}}{C^{0.15}}\right] \quad \left[\frac{26{,}000{,}000\ Q}{T^4}\right]$$

where Q = gal. of water per 1,000 cu. ft. of gas.

The above expression may be simplified in order that, once having established the operating qk of a scrubber, the water requirements may be estimated to an error of ±10%.

This simplification is to put $C^{0.15}$ equals 1.2, and is arrived at from the fact that $C^{0.15}$ changes from 1.1 to 1.27 as C changes from 2.0% to 5% NH_3 w/w in the strong bay liquor.

$$\text{Then } Q = \frac{qkT^4}{21{,}679{,}000\ (CO_2)^{0.75}} \quad (\pm 10\%)$$

A diagram has also been drawn on the basis of the simplification.

In using these diagrams, it is suggested that the washer qk is estimated when the gas flow is near that for which the washer was designed or, alternatively, at or near the gas flow at which the washer is normally operated, since, as has been pointed out by Redman, the mass transfer co-efficient is influenced by gas velocity and the gas film resistance to mass transfer increases as the gas flow falls. On the other hand, as gas velocity falls with constant liquor circulation within the bays, then the value of q (the liquor rate per unit of gas within the bay) will increase, tending to improve the overall mass transfer co-efficient. Evidently the performance of a washer is modified somewhat by the gas flow, but the diagrams will be found a useful guide since most scrubbers operate at a fairly narrow range of gas flows.

At any given point in time the station engineer carries as a fixed cost his capital charges and overheads. His labour costs are a variable over which he has some control and which are subject to frequent review. However, this review of labour is normally carried out periodically and, consequently, on a given day the engineer will achieve minimum costs when his net material cost per therm is at a minimum. The main factors which influence materials cost have been considered in this paper. By using the diagrams previously given together with the cost per therm diagrams, it is possible to quickly estimate materials cost, or to forecast increases or decreases which might result from a change in materials used, or a change in the proportion of the various gases which together make up the total production from the station. It is also possible to predict the changes which will result from price fluctuations in gasmaking materials or in revenue producing residuals.

It is not suggested that cost diagrams should be used indiscriminately since it will be evident that better accuracy can be achieved by more conventional means. They have been included for use in rough estimating, especially for comparison purposes, where a very accurate calculation of cost is not justified until an approximate set of gasmaking conditions has been established which would result in a minimum net materials cost.

DISCUSSION

The **President,** Mr. Hare, had set up a plan whereby station engineers, by the use of the graphs, could obtain gas economically and without going into involved calculations. He thought the alignment chart allowed of quick and accurate decisions, with the emphasis on 'quick.' In his view the paper would achieve its object in reducing the cost of production of gas as they knew it today.

He urged, without lowering the value of Mr. Hare's paper in any way, that the gas Press should reproduce nomograms, which could be most useful to operational staffs in running their plant to maximum efficiency in a minimum of time. Mr. Hare had spent hundreds of hours on the paper and deserved their heartiest congratulations. He had illustrated what alignment charts could do and the gas Press would do well to re-produce them for the benefit of gas engineers and the industry. They would be very useful in booklet form. He hoped that a subsequent president would complete the picture by providing alignment charts on the control of distribution.

Mr. D. W. Kay said the paper was one of the best he had heard.

Mr. G. Brook, Liverpool, thought the paper was of fundamental importance in its technical value.

Mr. H. Partington said the keynote of everything in the industry today was production. They were faced with a problem of getting the best out of their plant.

Mr. Hare remarked that his paper was intended to be something applicable to existing plant.

Mr. J. K. Lord mentioned that it had been suggested that discussions in general were deteriorating, but he did not think that applied to the Manchester District.

It was gratifying to note that they were proving more efficient than appeared to be possible in production.

If the President (Mr. Nicklin) would undertake to produce the author he would undertake to introduce him in his programme next year for the purpose he had suggested.

Mr. E. G. Clegg said if the charts could be used throughout the industry it would help the manufacturers of plant immensely.

Mr. F. Cartledge said Mr. Hare had produced a yard stick for engineers to take back to their plants and see how they measured up and how quickly and accurately results could be obtained. He agreed with the President that some of the yard sticks should be re-produced to enable engineers to give serious thought to the matter of reducing costs. That would be of great benefit to juniors. He thought they could achieve what they set out for.

In reply to Mr. Clegg, who referred to ammonia scrubbers, **Mr. Hare** said the paper was not concerned with ammonia washing but with plant as it now existed. It was their job to give to the consumer the best service at a minimum cost.

Holmes-Catco Process

A MAJOR cause of atmospheric pollution is the discharge to atmosphere of noxious fumes from industrial processes. This problem has been dealt with for many years in the U.S.A. by catalytic combustion, a low temperature oxidation process by which objectionable fumes are converted to odour free gases. This process, to be manufactured and marketed in the United Kingdom by the Chemical Engineering Division of W. C. Holmes & Co., Ltd., is to be known as the Holmes-Catco process.

Fumes, vapours, gases and odours of an organic nature produced in many industrial processes ranging from asphalt blowing to paint manufacture, and from organic chemical plant to paper manufacturing, can be treated by the Holmes-Catco process.

Catalytic combustion is the low temperature, flameless oxidation of combustible fumes and is applied to greatest advantage where the available energy is substantially below the lower limit of flammability. To maintain normal combustion by flame the two conditions of high temperature and a fuel air ratio within the flammability limit are necessary. If the fuel air ratio is below the lower limit of flammability the flame is extinguished and complete oxidation can then only be maintained by heating the mixture to temperatures of the order of 1,400°F.

Catalytic combustion has no minimum fuel air limits, and the oxidation temperature is no more than 500°F. approximately. Where necessary the fumes may be heated to this temperature by a fuel burner or electric heater incorporated in the ducting. The temperature rise of the fumes passing through the catalyst element is proportional to the concentration of combustible material which they contain. The heat liberated per unit quantity of hydrocarbons is the same as with flame combustion. With catalytic combustion there is no flame, but the catalyst may glow at high fume concentration.

The catalyst element is a frame on which a narrow heat and corrosion resistant nickel alloy ribbon enclosed between heat resistant alloy container screens is mounted; a coating of certain metals of the platinum group is bonded to all surfaces of the nickel alloy ribbon to form the catalyst. The element is of sturdy construction, and in general appearance resembles a metallic air filter mat. Elements of standard dimensions are used and can be grouped to handle any desired volume of fumes. The pressure drop across a complete assembly is low, being of the order of ¼ in. to ½ in. W.G. Dust particles normally present in the atmosphere have no clogging effects on the catalyst. If large amounts of sand, fly ash, and similar substances are present in the fumes, they must be removed prior to treatment in the Holmes-Catco plant.

In many cases the hot oxidised gases contain more heat than is required for operating the plant. This heat can be utilised in the process producing the fumes, such as an air heated oven, or recovered in a waste heat system.

The plant is extremely compact and can be connected to existing equipment. Running costs are low, and in processes where the heat in the oxidised gases can be utilised, the plant becomes a power producing unit. Being fully automatic the plant requires a minimum of attention. Maintenance is required for the fan drawing fumes through the process and for inspection and removal of the catalyst element for re-activation. The usual life of an element before reactivation is necessary varies from 1½ years to 3 years continuous running, depending on the nature of the application. Re-activation of a catalyst element is carried out by W. C. Holmes & Co., Ltd., at a very small cost.

A complete fume disposal service is thus available; it includes survey of the process causing fumes, design, construction, installation and re-activation service.

Heating and Ventilating Research Council

THE first annual report of the Heating and Ventilating Research Council has recently been published; it covers the Council's first full year, and describes its activities during this formative period. A general outline of the research programme has been drawn, but its full implementation has been retarded by difficulties, common to other research organisations, encountered in the recruitment of scientific staff. The main research project at present being pursued involves the investigation of intermittent heating, with its important implications for fuel economy. Intelligence and publications services have been initiated during the year, and the first bulletin of the Council, which was published in April, contained an account of the Council's inaugural meeting and a description of the premises and facilities available to it at the B.C.U.R.A. laboratories, Leatherhead. It is anticipated that these bulletins will be issued more frequently as the research projects get under way.

Applications for copies of the Report should be made to the Secretary, the Heating and Ventilating Research Council, B.C.U.R.A. laboratories, Randalls Road, Leatherhead, Surrey.

FAST-TRAVEL MOBILE CRANE IS *DIFFERENT*

THE Jones KL 10-10 'fast-travel' mobile crane demonstrated this month at the Letchworth works of K. & L. Steelfounders & Engineers, Limited, is the first machine in the Jones range to have a capacity of ten tons. It is said to represent a new approach to crane design, offering a combination of the advantages of the conventional mobile and of the lorry-mounted machine, with its high road-speed.

The differences between the K1 10-10 and a lorry-mounted machine are said to be that, whereas the latter consists of a lorry chassis, conventionally powered and controlled, on which is mounted a crane equipped with its own power unit and control cabin, with the KL 10-10 the drive for all crane motions and for high-speed road travel is taken from a single heavy-duty engine. Similarly, all controls are housed in one well-appointed cabin and are so arranged that one driver is able to command all motions, including travel.

Tested

The machine demonstrated is not a prototype. Indeed, the prototype machine has been subjected to some two years of intensive testing under every combination of the conditions likely to be met with by production models in service. This testing has included service with the George Cohen Dismantling and Demolition Department.

Substantial Orders

This demonstration marks the start of full production of the Jones KL 10-10, and already substantial orders have been placed. The steel and coal industries are represented among the firms which have placed these orders, which indicates a wide range of applications. *George Cohen Sons & Co., Ltd., Wood Lane, London, W.12.*

The Jones KL 10-10 'Fast-travel' mobile crane, with a capacity of ten tons.

Snackmaster Range of Cooking Equipment . . .

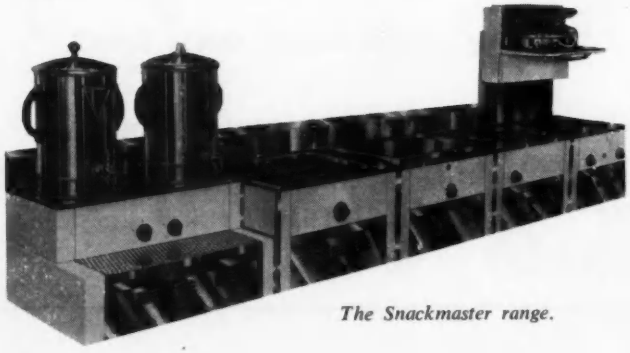
A new range of counter service units designed to produce 'big kitchen' production in the smallest possible space is being marketed by Aquafont Industries Ltd. Called the Snackmaster, the range comprises adaptable and expandable units of stainless-steel and cream vitreous enamel.

The Coffeemaster unit is, in its present form, already well known but has been remounted on a plinth to bring it into line with the other four units in the range and has a drip tray inset. The pyrex-lined milk urn holds 1 gal. and the coffee urn is capable of percolating 1 gal. of coffee.

Fish Fryer

The next unit in the range is the counter fish fryer with a stainless hob and a capacity of 2 gal. of fat. It is capable of frying 3 lb. of chips in seven minutes. The pan is insulated from the fryer body; is thermostatically controlled and complete with gas governor. Two wire chip baskets are supplied with the unit.

The griddle has a cast aluminium top measuring 20 in. by 14 in. This top is easily removed for cleaning and servicing and a compartment for heating plates is available under. The unit is fitted with gas governor and spring-loaded safety gas-cock with off, low and high positions.



The Snackmaster range.

. . . Solves the Space Problem

The top plate can be heated up to 450° within 20 minutes from lighting up.

The food warmer unit can be used for heating up and storing at correct serving temperature a variety of foods since the stainless-steel top is fitted with two 10-pint and one 6-pint stainless-steel containers. The unit has combined gas-cock and thermostat also gas governor, and has a storage compartment under for plates. This unit is a useful adjunct to the griddle, enabling baked beans, tomatoes or peas to be served with the grilled food.

Eye-level Grill

The boiling ring unit is fitted with two boiling rings controlled by spring-loaded safety gas-cock having off, low and high positions, and complete with gas governor. The boiling rings are inset into a stainless-steel hob, with plate compartment under. As an added feature of service, this unit can also be supplied with fold-away eye-level grill mounted over, complete with grill pan.

The whole range takes up only 9 ft. of space.—*Aquafont Industries, Ltd., 35, Kentish Town Road, London, N.W.1.*

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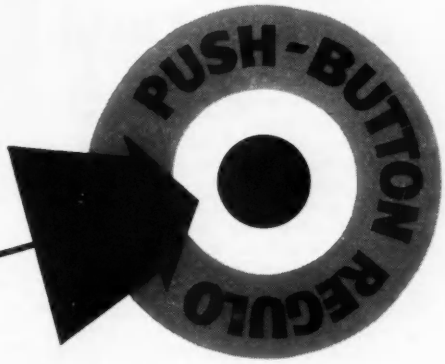

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Telescopic Lorry Body for Bulk Loads

CAN BE FITTED TO ANY CHASSIS

WALKERS and County Cars Ltd. have lately brought out the Jekta lorry body, which is suitable for carrying bulk loads such as stone aggregate, sand, coal or coke. This is the Jekta lorry body. The container holding the load is U-shaped and secured to a mild steel framework which can be fixed to any normal lorry chassis.

The Jekta body, of light steel, is divided into three sections which telescope into each other, making unloading in a confined space with limited head room a simple matter. Of these three sections, the biggest is rigidly attached to the rear of the chassis and holds a spring-loaded tail board hinged at its upper edge and opens upwards by pressure from the load in the lorry.

Of the other two sections, both of which can slide and 'nest' in the rear section, the front section, the smallest, is fitted with a sloping ramp or bulkhead which, on being forced from front to rear, compels the load to be discharged and when fully retracted the bottom of the bulkhead is flush with the rear face of the large rearmost section. Any load remaining in the body will run down the sloping face of the bulkhead and be discharged.

Sealing Strip

Each moving section is mounted on a pair of rollers at its front end which runs on rails secured to the chassis side members and between each moving section is a peripheral sealing strip which rests on its neighbour. Its function is to carry half the load in the section, to act as a joint between each section and thoroughly to clean the body. The motive power used for discharging the load, that is to say, for driving the front section to the rear, is a hydraulic ram, in two extensible, double acting sections, mounted behind the driver's cab, which acts horizontally on the foremost movable section. Power for this ram is derived from a standard hydraulic pump through a power take off from the gear box as in a tipping body.

The chief advantages to be gained from this type of lorry body when used for coke, are that coke stocking is easier as the coke can be ejected onto an existing coke stack, it can feed a raised conveyor or deliver to a hopper above ground level, it affords better control over the ejection of the load and it can work when there is confined headroom.

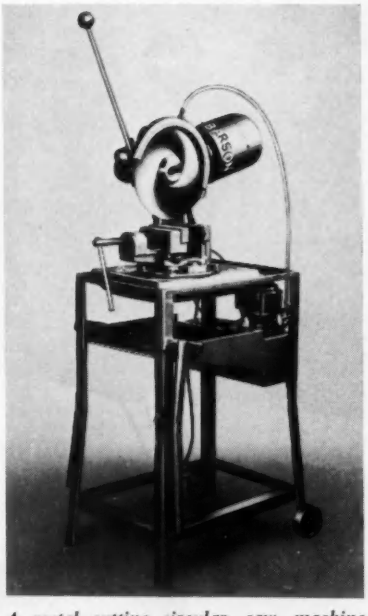
The Jekta lorry body with a Thames (Ford) chassis.

It has been claimed that when normally using this vehicle for coke transport, should it be unavailable at any time, two ordinary lorries are needed to do its work.—*Walkers and County Cars, Ltd., Fleet, Hants*

Mobile Studio

Technivision Limited—a specialist organisation devoted to 'better technical education, including the production of technical literature, illustrating, writing and production,' has converted a caravan into a mobile studio. The studio is spacious enough to accommodate illustrators, a visualiser and a technical writer, who can all work under normal conditions.

The van is fitted out as a display unit and will be visiting chosen sites in various industrial centres throughout the country where potential clients can visit and inspect the quality of the Company's work.—*Technivision Limited, 51, Brompton Road, Knightsbridge, London, S.W.3.*



A metal cutting circular saw machine called the Barson has just been added to the range of products of J. C. Neville, Limited. It was exhibited at the Factory Equipment Exhibition which ended May 4. The machine comes in two sizes: (1) for cutting up to 2⅜ in. diameter, and (2) up to 3½ in. diameter. It is specially constructed for cutting iron and steel tubes and rods, and there is an adapted model for non-ferrous metals.

The Fire Fiend

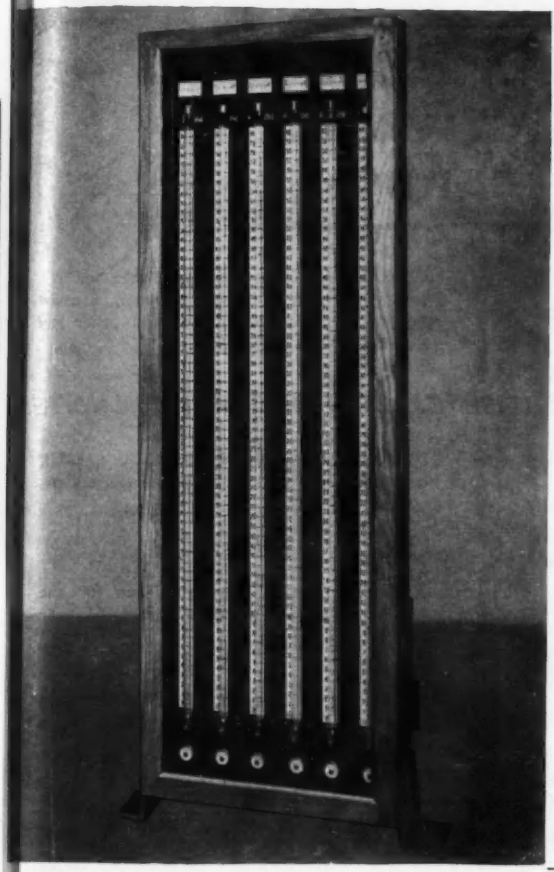
In the latest issue of *Fire Fighting News* issued by Nu-Swift, Ltd., details are given of the harnessing by the Company of science's latest 'wonder child,' chlorobromomethane (C.B.M.), which has been incorporated in the Company's quart-size Chloro-Flash extinguishers.

Three times more effective than carbon tetrachloride (C.T.C.) fire fighters, Chloro-Flash extinguishers are recommended wherever extra-hazardous fire risks exist, such as electric motors, fans, switchgear, neon signs, radar, organic solvent risks of medium size and engine and fuel risks in garages and vehicles.—*Nu-Swift, Ltd., Elland, Yorks.*

NEW OFFICES

THE associated companies of George Ellison Limited and Tufnol Limited announce that their respective London offices in Victoria Street, have been transferred to: Ellison House, Connaught Place, London, W.2. From this conveniently situated building will be conducted the southern area sales and technical service for Ellison switchgear and hydraulic valves, and for Tufnol, the non-metallic material for engineering components. The telephone number for both companies will be Ambassador 3121 and the telegraphic address: Starters, Telex, London (for George Ellison Ltd.) and Tufnol, Telex, London (for Tufnol Ltd.).

Due to continued expansion, Honeywell-Brown Limited have recently opened a new branch office at; 5-7, New York Road, Leeds, 2.



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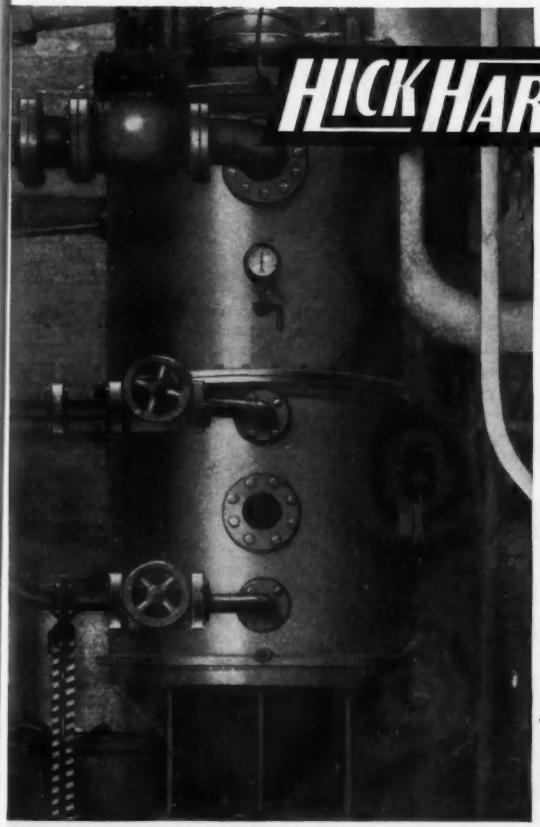

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H127A

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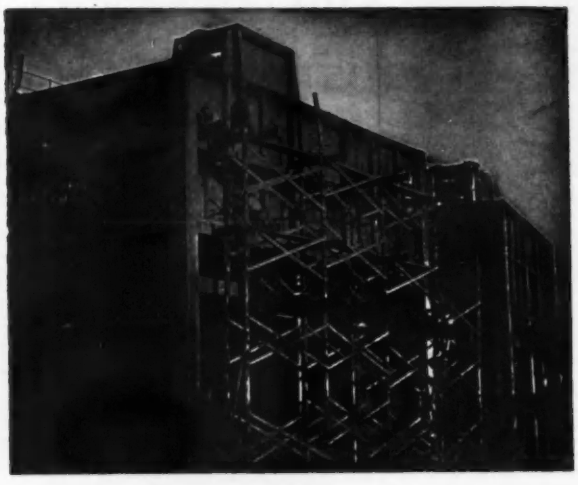

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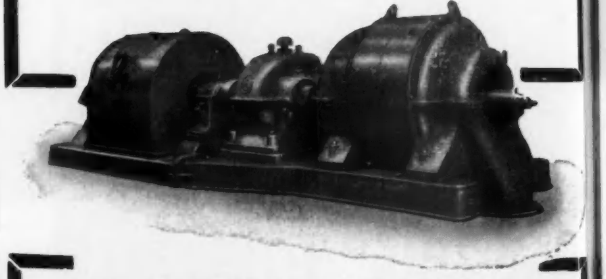

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ENGINEER familiar with the gas and/or coke-oven industry and works practice, who can write clear and concise English, required as assistant to the editor of a monthly technical journal. No. 323, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

SOUTH EASTERN GAS BOARD

CHEMICAL ENGINEER, TAR WORKS,
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THE successful applicant will be concerned mainly with the preparation of mass and energy balances, flow diagrams and plant layouts and liaison with contracting firms for the construction of new plant for the manufacture of organic chemicals on a large scale.

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Salary not less than £1,000 p.a. with prospects of advancement.

Applications, quoting reference V 10/785, should reach the Personnel Manager, South Eastern Gas Board, Katharine Street, Croydon.

SOUTH EASTERN GAS BOARD

HOME SERVICE ADVISER,
MEDWAY DIVISION
(ROCHESTER, SHEPPEY AND SITTINGBOURNE AREAS)

SUCCESSFUL applicant will be required to conduct demonstrations, give lectures and advise consumers in their own homes in the use and care of gas equipment.

Applicants must have undergone training for two years at a recognised training college of Domestic Arts and hold a diploma in cookery, housewifery and laundry work.

Salary, 21 years of age and over, £413-£638 p.a. rising to £720 p.a., according to experience.

Applications, quoting reference V10/807 should reach the Personnel Manager, South Eastern Gas Board, Katharine Street, Croydon, within seven days.

THE BRITISH COKING INDUSTRY ASSOCIATION invites applications for the post of TECHNICAL ASSISTANT at Acton Testing Station, W.4, where the testing of appliances and cokes for household use is carried out for the Coking Industry. Men applying should be 20-25 years of age, have scientific training and should preferably have completed National Service. The appointment is pensionable and the salary offered is approximately £500 p.a. according to age and qualifications.

Write giving full details to the Secretary, British Coking Industry Association, 74, Grosvenor Street, London, W.1.

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SENIOR TECHNICAL ASSISTANT,
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Applicants should have experience of Continuous Vertical Retorts, C.W.G. and normal ancillary plant.

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The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, should be forwarded to Mr. W. Oldham, Divisional General Manager, West Midlands Gas Board, Sidney House, School Court, Shrewsbury, to reach him not later than Monday, June 10, 1957.

K. W. NEVETT,
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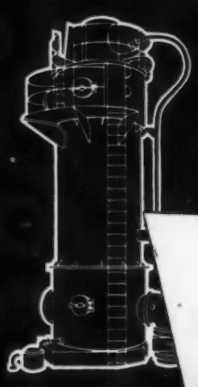

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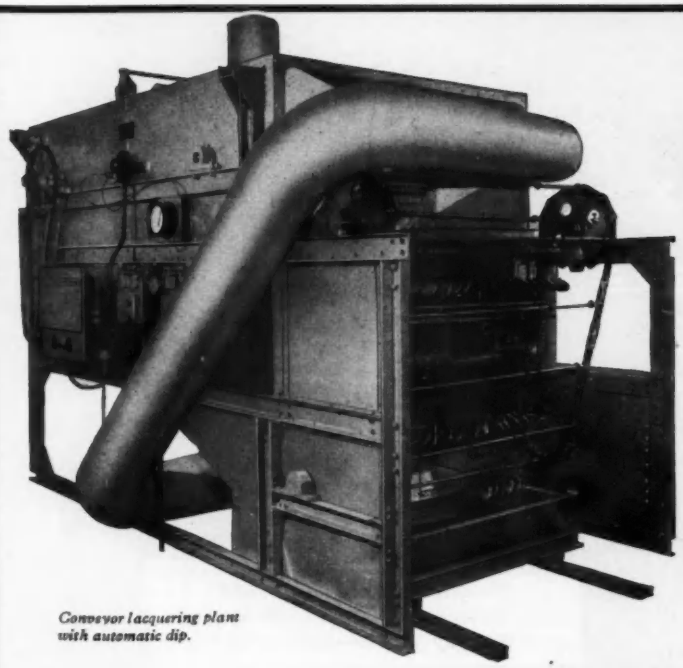

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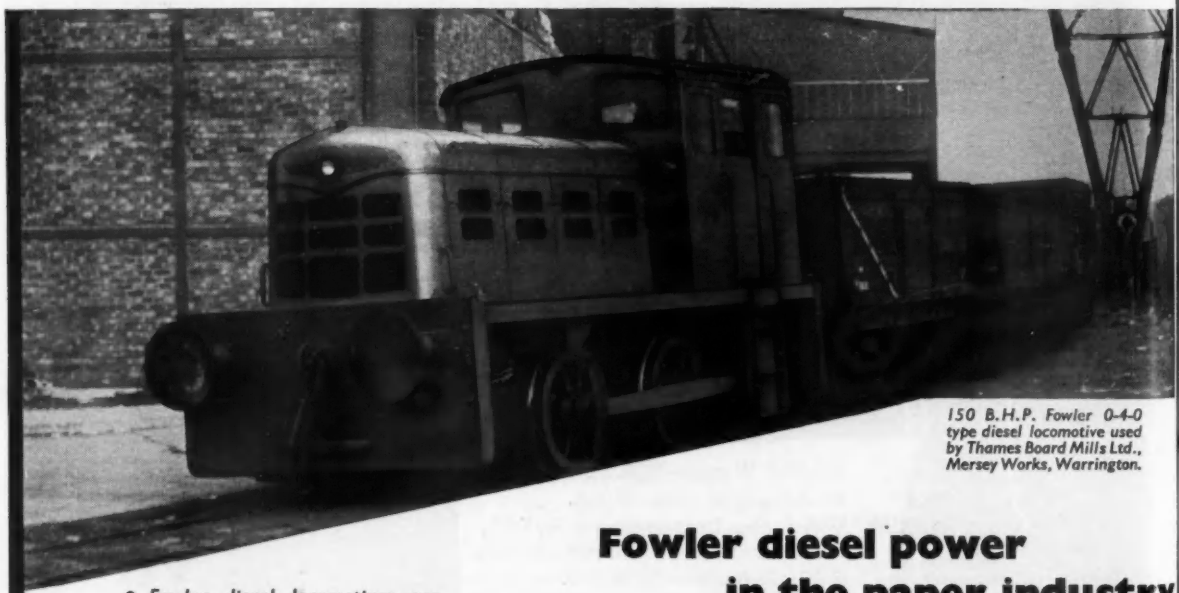

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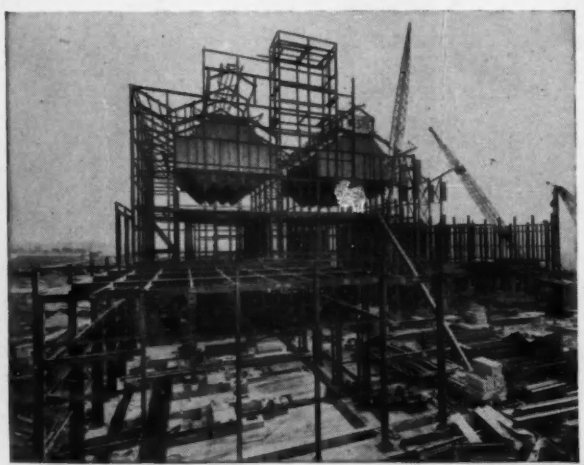

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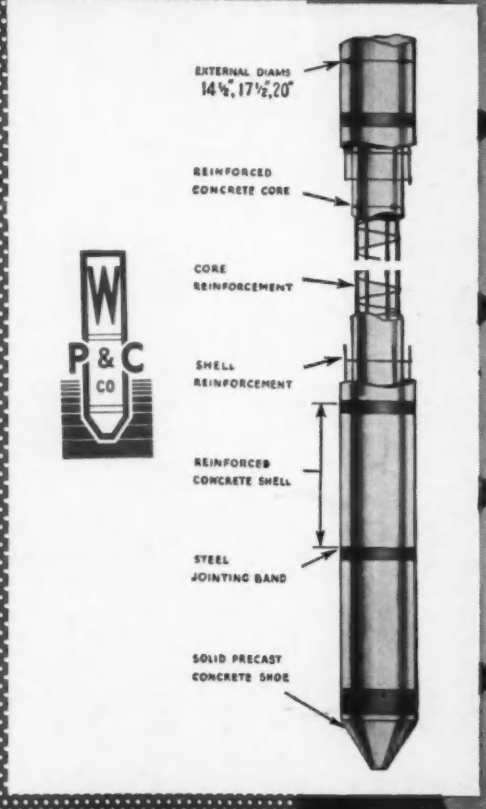

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